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SUMMARY OF RECENT ABSTRACTS *

VII. HELMINTHIASIS †

(Continued from p. 916)

Nematodes

General

Müller (pp. 1244, 1245) describes her technique for examination of sewage, crops and soil for helminth eggs. In Leipzig sewage is inadequately treated before being used as manure, and she has found eggs of many human parasitic worms in it. She lists these, giving the numbers found per litre. In a test of treatment processes for the removal of helminth eggs (particularly *Ascaris*) from sewage Bhaskaran *et al.* (p. 906) found that none of the ordinary processes removed helminth eggs completely, but trickling filters and activated sludge processes, when properly operated and maintained, remove almost all. In Japan Katayama (p. 222) uses a simple method of heat treatment to destroy parasitic ova, pathogenic bacteria and fly maggots in human faeces before use for fertilization of soil.

Hookworm Infection, etc.

A focus of hookworm infection at an oasis in Algeria is described by Mandoul and Aroua (p. 1254).

A completely new method of cultivating hookworm larvae from faeces spread on filter paper which is kept moist, is described by Harada and

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1956, v. 53. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on helminthiasis in this series see the August and September issues of the *Tropical Diseases Bulletin* each year since 1939.

Mori (p. 343), who found it considerably more effective than flotation methods for detecting infection. Palmer (p. 83) observed the egg production by *Necator americanus* in a man not subject to re-infection. Eggs were produced in large numbers for 6 years, but the total fell gradually to nil in the 15th year.

Lie Kian Joe and Tan Kok Siang (p. 1147) report cases of actual invasion of the intestinal wall by *A. duodenale*. They state that when a female worm invades the intestinal wall and deposits eggs there, the eggs may hatch to rhabditiform larvae (which have been found there), but filariform larvae have never been found. They state that development to the filariform stage could take place, and they think that such larvae could enter the blood, to develop in the normal way. If this is so, auto-infection is possible, and could be serious. Working in India, Leslie and Tovey (p. 904) investigated the association of ankylostomiasis with symptoms of duodenal ulceration, but they concluded that ulceration was not commonly caused by hookworm infection. They indicate how genuine ulceration can be differentiated from duodenitis due to the worms.

Investigating eosinophilia in East African and Mauritian troops, Trapnell (p. 895) found that in almost all cases it was associated with intestinal worms, of which hookworms were the commonest.

Del Zoppo (p. 343) discusses clinical findings and treatment in a series of patients with hookworm infection. Thymol treatment needed to be repeated in many cases, and often produced vomiting, fever and diarrhoea. A chenopodium-tetrachloride mixture was also used. For the anaemia iron was given by mouth or intravenously, or liver extract. Pinto *et al.* (p. 1454) state that the omission of a saline purge after treatment with tetrachlorethylene increases its effectiveness; it is easier to give in this way for mass treatment.

For hookworm, *Ascaris* and *Trichuris* infections Da Costa (p. 1364) has found that hexylresorcinol and mepacrine together are more effective than either separately. Elbers (p. 1256) writes favourably of the effect of a preparation Vermella (a halogen oxy-derivative of 1 methyl-4-isopropylbenzol) in the treatment of hookworm, *Ascaris* and *Enterobius* infections. It is said to be less toxic than hexylresorcinol.

There is general agreement that the piperazine compounds are ineffective in hookworm infection (Hoekenga, p. 627; Abdalla and Saif, p. 781; Hugon, p. 1456).

Strongyloides stercoralis is one of the helminths which evoke hypereosinophilia; Montestruc and Berdonneau (p. 1029) note that the larvae are difficult to find by simple examination of faeces, or even by concentration methods. Repeated coproculture may be necessary. Gillet *et al.* (p. 905) found lucanthone very satisfactory for the treatment of *Strongyloides* infection in Africans. It was given by mouth in daily doses (divided) of 5–20 mgm. per kgm. for 2 or 6 days. The shorter course was quite effective; the drug was well tolerated.

By a technique of duodenal drainage Maki *et al.* (p. 345) in Japan found infection with *Trichostrongylus orientalis* in 58% and 90% of schoolchildren in 2 towns.

Ascaris Infection, etc.

Samples of soil from Alexandria and the surrounding villages were found by Dawood (p. 626) to be heavily infected with *Ascaris* eggs.

Observations on Japanese prisoners suggest that *Ascaris* may survive in the human host for 10–24 months, average 17 ± 3 (Hobo, p. 1255).

Yasuda (p. 1363) has developed a technique for examining gall stones for the remains of parasites they may contain; he concludes that in Japan *Ascaris* plays a great part in their formation.

In Fiji Hemming (p. 1149) found that a heavy infection rate with *A. lumbricoides* in Indian children was associated with a high incidence of apparent asthma. He reports 100 cases of *Ascaris* pneumonitis, and describes a typical case. Similarly, in Bolivia Kempski (p. 626) relates asthma in children to helminthic infection, especially with *Ascaris* and hookworms, and to trauma to the lung tissue caused by migrating larvae. The use of anthelmintics made treatment for the asthma unnecessary.

In discussing a case of acute intestinal obstruction due to *Ascaris*, Pattanayak and Thomas (p. 222) deprecate surgical interference or treatment with santonin, having found treatment with diethylcarbamazine effective in dislodging the worms.

For treatment diethylcarbamazine has been found useful by Hugon (p. 1456); piperazine citrate by López Rico *et al.* (p. 627), Hoekenga (p. 627), and Donso (p. 1030); piperazine hydrate by Amato Neto and Corrêa (p. 780) and Fields *et al.* (p. 1149); piperazine adipate by Abdalla and Saif (p. 781), Basnuevo *et al.* (p. 906), and Ricci and Corbo (p. 1368). Schedules of dosages are given in the original abstracts. Hugon (p. 1456) found that proguanil had a considerable effect, which should be investigated further. The oil of the shell of the cashew nut has been used as an anthelmintic by Bhaduri *et al.* (p. 628) for various infections, with only moderate results; the action is best against *Ascaris*. Vora (p. 345) found intragastric oxygen (1,000 cc. after overnight starvation) about as effective as santonin; there were no serious side effects.

A human infection with *Lagochilascaris minor* is described from Surinam by Winckel and Treurniet (p. 1150).

Visceral larva migrans is attributed to the ingestion of embryonated eggs of *Toxocara* species from dogs or cats, and the subsequent migration of the larvae. Heiner and Kevy (p. 1151) give an account of 3 cases in children (sisters) in the United States. Features were splenomegaly, hepatomegaly, recurring pneumonitis and rashes. Pica is common and this may have led to infection from the faeces of dogs and cats, and the pica may also be associated with lead poisoning. There is no treatment of proved value against the fulminating respiratory distress that may

occur, but antibiotics, epinephrine, corticotrophin and (cautiously) anthelmintics may be tried. Two other cases of visceral larva migrans, in which *Toxocara larvae* were identified in liver biopsy specimens, are reported by KARPINSKI *et al.* (p. 1457). In papers on the aetiology of this condition NICHOLS (pp. 1457, 1458) describes the diagnostic morphology of infective second-stage larvae of *Toxocara canis* and *T. cati*, and of *Ascaris*, *Necator*, *Strongyloides* and *Ancylostoma caninum*. *Toxocara* and *A. caninum* may produce visceral larva migrans in man.

Filarial Infections

For his Presidential Address to the Royal Society of Tropical Medicine and Hygiene, GORDON (p. 1031) spoke about the host-parasite relationship in filariasis, defining a good host as one which allows a suitable proportion of the introduced parasites to reach that stage of development most propitious for the propagation of the species. Man is not a particularly good host for *Loa loa*, but certain species of monkeys, and the fly *Chrysops*, are good hosts representing the normal and well established cycle of development. It is at present assumed that there is no animal reservoir for onchocerciasis and wuchereriasis, but we cannot be sure that this is true. He points out that in malaria the parasite can reproduce itself until saturation of the host is reached, but in filariasis this is not so, and the introduction of one infective larva can result in the production of one adult only. In onchocerciasis the host-parasite relationship is disturbed only after a long series of infective bites have been received by the human host, but it seems possible that even a small reduction in the infective density of the vector may lead to reduction in the incidence of blindness, and if this is confirmed it has an immediate bearing on the planning of measures of control. Professor Gordon discussed such matters in some detail, indicating that their study may be essential to understanding and successful application of knowledge for control.

In their studies on the intake of microfilariae by insect vectors KERSHAW *et al.* (p. 89) conclude that the mosquitoes (*Aëdes aegypti*) which will usually survive to transmit the infection (*Dirofilaria immitis*) take up initially only about one-quarter of the number of microfilariae which would be expected on the basis of the density in the blood stream of the dog host.

WILSON (p. 1156) has found that in thick blood films stained with dilute Giemsa there are colour contrasts between microfilariae of *Wuchereria malayi* and *W. bancrofti* which are a considerable help in differentiation. GOLVAN (p. 1365) discusses the attitudes and appearances of microfilariae of various species and genera in films of human blood; even under the most unfavourable conditions it is possible to diagnose the different species.

HAWKING (p. 1466) attempted to identify the stimuli which affect the migration of microfilariae of monkeys, dogs and other animals. He

tested the effect of variations in oxygen and carbon dioxide pressure, anaesthetics, hyperventilation, etc., but the results were not sufficiently uniform to provide an explanation. YOELI (p. 1463) has observed agglutination of microfilariae of *W. bancrofti* in venous blood after addition of heparin, and considers that agglutination within the vessels of the lungs accounts for the periodicity of the microfilariae in the peripheral blood. The mechanism of these periodic phenomena originates in cyclical changes in the blood during periods of work and rest.

GALLIARD (p. 636) discusses the whole subject of eosinophilia in filariasis.

MINNING and MCFADZEAN (p. 1459) used an antigen from *D. immitis* in complement-fixation tests for filariasis in Gambia, but found the test negative in a proportion of people who had microfilariae of *W. bancrofti* or *Dipetalonema perstans* in the blood, and positive in a minority of persons without microfilariae (though in comment Gordon suggests that the examination of 20 cmm. of blood—as in this work—is not enough to exclude microfilariae completely). They discuss possible reasons for these anomalies. In an investigation of the complement-fixation test in filariasis, with a group antigen from *D. immitis*, RIDLEY (p. 1464) has found that the only really satisfactory results are in loiasis. The incidence of positive reactions is low in *W. bancrofti* infection.

HAWKING (p. 1039) sums up the chemotherapy of filarial infections in a comprehensive paper which should be read in full.

Using diethylcarbamazine labelled with radio-active carbon BANGHAM (p. 639) found that there was no preferential uptake by any organ or tissue of the host or by the microfilariae of *Litomosoides carinii* or *Dirofilaria immitis*. The microfilariae, however, are apparently modified in some way by the drug so that they are removed like foreign bodies.

Wuchereria bancrofti

It is known that *W. bancrofti* infection is present in a proportion of Jews from India who have settled in Israel, but YOELI (p. 1458) thinks that transmission is unlikely except in some of the less hygienic settlements. Courses of treatment with diethylcarbamazine have been carried out.

FRANCO and DE MENEZES (p. 346) found a heavy incidence of *W. bancrofti* in the island of Santiago, Cape Verde.

JORDAN (pp. 222, 1460) reports filariasis surveys in Tanganyika, where *W. bancrofti* is found on the coast and near the great lakes—in areas of high temperature and vapour pressure and where the population is relatively dense. It is not found over 4,500 feet above sea level. Males are more often affected than females, but the explanation of this is not clear, and it cannot (as in the South Pacific) be related to employment. *D. perstans* is found in some areas, and may be responsible for elephantiasis where *W. bancrofti* is not common (JORDAN *et al.*, p. 629). In

Ukara Island in Lake Victoria, where the incidence of *W. bancrofti* is high, SMITH (p. 466) found infective larvae in wild *A. gambiae* and *A. funestus*. Both feed at night and are highly anthropophilic, and they are most probably the vectors of the infection.

In the capital of Surinam the infection rate with *W. bancrofti* was found by VAN DER KUYP (p. 781) to be 17·4%; the rate was lower in rural areas. 80% of persons treated with diethylcarbamazine were free from the infection a year later.

A considerable incidence of *W. bancrofti* infection is reported by NEVES and SCAFF (p. 346) in Brazilian military units stationed in Amazonia. In Brazil RACHOU and his colleagues (pp. 85, 89, 1035) have found *W. bancrofti* principally along the coast, the vector being *C. fatigans* though other mosquitoes may play some part, including *Aëdes scapularis* which may transmit the disease out of doors. The DDT malaria campaign has not been followed by a reduction in filariasis, but house spraying with BHC emulsion or dieldrin might be more effective. They point out (p. 87, 88) that it is not enough to regard the absence of a sheath as a differentiation between microfilariae of *Mansonella ozzardi* and *W. bancrofti*; other characters, discussed in detail, must be studied. RACHOU (pp. 470, 907) has observed considerable daily, weekly and seasonal variation in the density of microfilariae of *W. bancrofti*—in general higher in autumn and winter than at other times. The daily variations may mean that a number of positive cases may be missed in surveys when the general incidence is low.

NEVES and SCAFF (p. 632) in Brazil found microfilariae of *W. bancrofti* in the placental and cord blood of several newborn infants, and they therefore believe that congenital microfilaraemia occurs.

Culex fatigans is the recognized vector of *W. bancrofti* in Ceylon, but NILES and SAMARAWICKRAMA (p. 1034) produce experimental evidence which suggests that *Anopheles hyrcanus* var. *nigerrimus* may also be a vector.

In two islands of the Comoro Archipelago BRYGOO and ESCOLIVET (p. 1153) found microfilariae of *W. bancrofti* in almost 50% of males and in a smaller proportion of females. They give a list of mosquitoes, but the precise identity of the vectors needs more research.

ROZEBOOM and CABRERA (p. 1155) report an association between the incidence of *W. bancrofti* infection and the cultivation of Manila hemp in the Philippine Islands, where the rate of infection is higher in adult males than in adult females, probably because the men are more exposed to bites of the vector mosquitoes while working. *Aëdes poicilius*, which bites out of doors as well as indoors, appears to be an important vector.

MCCARTHY and FITZGERALD (p. 633), in discussing the epidemiology of filariasis in Western Samoa, show that, after early childhood, males by working in plantations are more in contact with the mosquito vectors than females, and that males are more vulnerable in that they wear less clothing than females. Coastal villages are not heavy foci of infection,

compared with inland villages, and bush tracks and plantations are the common sites of transmission. (Similar points are made by Laird (p. 109) writing about Tokelau.) For the development of major physical signs of filarial disease a certain minimum parasite load is required, to be maintained for some years, and the authors suggest that an average count of 60 microfilariae per 20 cmm. of blood will lead to hydrocele in males in 5 years, and elephantiasis in 10. McCarthy (p. 634) reports some evidence of periodicity in *W. bancrofti* microfilariae in Western Samoa, which coincides with the biting activity of the vector, *Aëdes polynesiensis*. He has observed that in some of the microfilariae the tail is folded on itself (reflexed) within the sheath, and he regards these as young forms. The increase in numbers of microfilariae in the blood (between 9 a.m. and noon) is due to both young and old forms. The fact that larvae remain reflexed until reaching the blood stream may perhaps be explained by the low available oxygen content of the lymph. These conclusions are questioned in comment by Manson-Bahr, who thinks that the folding of the tail may be an agonal phenomenon.

Experimental work suggests that *Aëdes vigilax*, *Aëdes notoscriptus* and *C. fatigans* are susceptible to infection with non-periodic *W. bancrofti* in New Caledonia, but Iyengar and Menon (p. 1463) think that only *Aëdes vigilax* is an important vector as the other two are not found in large numbers.

Thooris (p. 1464) discusses the aetiology of acute lymphangitis in *W. bancrofti* infection, the most popular theory being that it is allergic in origin. He did not find much evidence of a bacterial factor in patients in whom he made cultures from glands and blood. For treatment he found aspirin useful and antibiotics unhelpful, but prophylactic treatment with diethylcarbamazine had apparently some effect, as had suramin, and desensitization with extracts of *D. immitis* was even more successful.

Nelson and Cruikshank (p. 1257) have summed up the course of filariasis in Fiji in the years 1944–55. Control of the main vector, *Aëdes polynesiensis*, is difficult, partly because it does not rest in houses and therefore cannot be controlled by house-spraying with insecticides. The value of the introduction of *Megarhinus* species, whose larvae prey upon the larvae of *Aëdes polynesiensis*, has been doubtful. Control of breeding places demands hard work and the benefit to the people is not apparent to them, since other biting species remain. Diethylcarbamazine treatment has been tried on a large scale, and the optimum dosage for all ages over 1 year is 50 mgm. on one day each month for 12 months.

Alhadeff (p. 83) describes the clinical features of acute filariasis in Mauritian troops stationed in the Suez Canal zone. Microfilariae were found in the blood in 13 of the 33 patients.

Enlargement of lymphatic glands is regarded as a common sign of *W. bancrofti* infection, but Edeson (p. 225) found it valueless in young children in Malaya.

A technique of lymphangiography by injection of a dye to show lymph

trunks, into which radio-opaque material is then injected, is described by KINMONTH *et al.* (p. 1158), who have used it in the investigation of elephantiasis. MARKELL and KERREST (p. 470) treated elephantiasis with cortisone together with conventional bandage therapy, and report definite benefit. The dosage of cortisone was 100 mgm. daily in divided doses for 30 days or more.

In Gambia 122 persons infected with *W. bancrofti* were treated with diethylcarbamazine in 1951. MCGREGOR and GILLES (p. 638) report that a cure rate of 64·7% 10 months later had risen to 73·8% 3¾ years after treatment. There were a few "relapses" after apparent cure. NEVES *et al.* (pp. 638, 639) in Brazil report great reduction in microfilarial (*W. bancrofti*) density in persons treated with diethylcarbamazine, which was maintained for 18 months.

From Madagascar GALLIARD and his colleagues (pp. 630, 782) describe a microfilaria which they regard as a new variety (*vauceli*) of *W. bancrofti*; there is a superficial resemblance to microfilariae of *W. malayi*, but there are important differences. 4 other subjects carrying this variety are recorded by SOUVEINE *et al.* (p. 1154) from Madagascar.

Wuchereria malayi

EDESON *et al.* (p. 349) made the important discovery of a microfilaria indistinguishable from that of *W. malayi* in a Kra monkey in Malaya; this could develop readily in *Mansonia* species. Attempts to infect monkeys with larvae of human *W. malayi*, however, were unsuccessful. Similar microfilariae were found in the loris, the leaf-monkey, domestic dog and cat, and adults from the Kra monkey, dog and cat. Two species are involved, one is distinct from *W. malayi* of man, but the other (from the Kra monkey and a cat) is much closer to the human worm. The relationship to *W. malayi* of man cannot yet be assessed, but the findings mean that the results of field dissections for filarial larvae are now confused because their origin is now doubtful. BUCKLEY and EDESON (p. 1156) report on adult filarial worms recovered from animals. One seems to be a new species—named *W. pahangi*, from a dog and a cat. One from a Kra monkey closely resembles *W. malayi*, and one from cats may be *W. pahangi*. They remark that more work is needed to decide whether, if the species from the monkey is indeed *W. malayi*, the monkey is a true reservoir of the human infection.

In the large numbers of persons evacuated in 1955 from the Ta-Chai islands to Formosa WU and HUANG (p. 631) found microfilariae (mostly *W. malayi* with a few *W. bancrofti*) in the night blood of 9·39%. The incidence in Formosa itself was very low.

Onchocerca volvulus

In the West Nile district of Uganda almost the whole population is infected with *O. volvulus*, and NELSON (p. 783) states that most nodules are found round the pelvis. BURCH *et al.* (p. 640) found nodules in

19·4% of male plantation labourers in Liberia; and 90% of the nodules were in the pelvic region. Some subjects had nodules though skin biopsies and scarification smears were negative. Microfilariae were demonstrated more often by biopsy than by smear, but in biopsy material *W. bancrofti* and *D. perstans* were sometimes found, and differentiation necessitated staining. Ocular complications were infrequent.

Jamison *et al.* (p. 90) compared the structure of normal skin in Africans with that of skin infected by microfilariae of *O. volvulus*; in the infected skin there was reduction of dermal and subepidermal elastic fibres, with reduction of thickness of the epidermis and proliferation of connective tissue.

Lapeyssonnie (pp. 783, 1467) points out that onchocerciasis may be mistaken for yaws, and that useless and dangerous treatment with bismuth and arsenic may therefore be given; serological control is necessary if mistakes are to be avoided. In comment Wright points out that the author does not discuss the possible co-existence of a treponematosis and onchocerciasis.

In 2 states of Mexico where onchocerciasis is prevalent Ruiz Reyes (p. 472) found that the nodules tended to appear largely in the occipital region. Eye complications were common. He found that 2–5 mgm. of diethylcarbamazine per kgm. twice daily for 10 days (or even 5 days) destroyed the microfilariae in 80% within a few days. Control of the breeding of *Simulium* by DDT in streams was successful, and details are given of the dosage used.

Suramin has been used satisfactorily by several workers. Conran and Waddy (p. 1038) gave doses of 1 gm. weekly for 5 weeks, and found that it restored sight to many blind or partially blind patients. It is the treatment of choice for rural areas. Weyts (p. 932) advocates excision of nodules, a 15-day course of diethylcarbamazine, and a course of suramin for ocular onchocerciasis. Chartres (p. 353) reports that he and his wife (both being infected) found diethylcarbamazine a failure, but were cured by suramin—their incubation periods were 15 and 18 months after exposure. On the other hand Nelson (p. 783) found suramin disappointing in the field and concludes that it should only be used if the patients can be kept under close observation.

Species of *Simulium* are described and discussed for Somaliland (Lipparoni, p. 680), Ethiopia (Grenier and Ovazza, p. 1278), French West Africa (Grenier *et al.*, p. 1038) and Guatemala (Dalmat, p. 518; Gibson, p. 641).

Onchocerciasis was found a few years ago along the Mayo Kebbi river in French Equatorial Africa, and Taufflieb (p. 473) gives an account of the successful measures taken to control *Simulium*, partly by spraying the bush with BHC from a helicopter at regular intervals, and partly by treating the river with DDT, again at regular intervals. The results were very satisfactory, and there was no evidence of general pollution of the lake into which the river flows, or of undue damage to fish in the

dosage finally recommended. Blanc and D'Aubenton (p. 1160) discuss the point, remarking that the people of Upper Volta, French West Africa, are dependent on fish as food, and therefore any campaign against *Simulium* by using insecticides in streams must take into account their effect on fish. Lindane is toxic to the local fish and it is not known if non-toxic doses of DDT are effective against *Simulium*.

A Pilot study for the control of larvae of *Simulium* by the treatment of streams with DDT is described by Lea and Dalmat (p. 226) from Guatemala. They quote the doses of DDT for streams of various sizes and the periods during which it was administered. The results were encouraging.

Loa loa

Duke (p. 352) has been able to show that the presence of smoke from a wood fire greatly increases the biting rate of *Chrysops silacea* on African bait-boys. It may be important in attracting *Chrysops* from the forest to feed in houses. He (p. 909) suggests that flies from the forest canopy are attracted to groups of people, especially moving groups, and that biting density remains high much further from the margin of forest with tall trees than from the edge of areas of low vegetation. The taller trees appear to provide sufficient shade and resting places for longer excursions.

Schofield (p. 351) reports peripheral nerve involvement in 2 cases of loiasis treated with diethylcarbamazine. They were probably the result of allergic reactions due to death or encystment of *L. loa* in close proximity to the ulnar and median nerves respectively.

Dipetalonema perstans; Mansonella ozzardi

Jordan (p. 222) shows that the incidence of *D. perstans* is extensive in Tanganyika, especially in the south. The incidence varies inversely with rainfall and it seems that in some areas where *Culicoides* would be expected in the banana plantations, but where in fact it is not common, the reason may be that the rainfall is too heavy. *D. perstans* is found in part of Mozambique, where Reis (p. 1159) shows that the incidence in males is 3 times as high as in females.

Nicholas *et al.* (p. 910) describe the distribution of species of *Culicoides* in parts of Nigeria, and their breeding in rotting banana and other material.

In patients infected with *D. perstans* diethylcarbamazine has some effect on the microfilariae when it is given by mouth, but does not cure the infection. Strohschneider (p. 1036) therefore argued that if a strong concentration could be brought into contact with the adult worms it might be effective against them, but the reaction of the peritoneal tissue in which they lie may form a barrier to blood-borne drugs. He therefore treated 2 patients by combined oral and intraperitoneal administration of diethylcarbamazine by a technique which he describes, and this was successful in 1 case.

Fros (p. 1157) gives an account of filariasis, especially infection with *M. ozzardi* and *D. perstans*, in Surinam. Deane *et al.* (p. 88) think that the vector of *M. ozzardi* in Brazil (where it is found inland) must be an insect which feeds out of doors.

Dracunculus medinensis

Experiments in North Ashanti indicated that treatment of wells or ponds with DDT was effective in lowering considerably the incidence of guineaworm infection; Nugent *et al.* (p. 353) point out that this procedure is simple, and they suggest further trial in rural areas where the provision of wells or piped supplies is likely to be delayed.

Onabamiro (p. 1468) found that solutions of diethylcarbamazine had little effect on fresh larvae of *D. medinensis* or on larvae enclosed in *Cyclops*.

Enterobius Infections

A single examination by the cellulose tape method is not enough to detect all infections with *E. vermicularis*, and Sadun and Melvin (p. 1040) advocate 6 examinations for accuracy.

Croce *et al.* (p. 642) report a case of salpingitis due to *E. vermicularis*.

Piperazine compounds have been used successfully in *Enterobius* infections—citrate (Carter and Maley, p. 1469); hydrate (Bergstermann and Bogner, p. 93; Biguet *et al.*, p. 227; Pistoletti, p. 911; Brown *et al.*, p. 1368); adipate (Semenova *et al.*, p. 466); and dilaurate (Cavier and Gaulin, p. 354).

Wechselberg (p. 1369) reviews the records of toxicity of piperazine compounds, quoting cases of accidental overdosage. He concludes that it is a safe treatment for worms so long as children are kept under observation by their parents while taking it. It should not be given during illness involving the central nervous system. Combes *et al.* (p. 643) write similarly, and advise caution in patients with impaired renal function.

Owings (p. 475) reports success in 85% of a group of children with *Enterobius* infection after treatment with oxytetracycline (0·5–1·0 gm. daily, according to age, in divided doses for 4 days). He claims that this drug has the highest cure rate, but is costly and should be reserved for patients with co-existent infections requiring a broad-spectrum antibiotic. Loughlin and Mullin (p. 784) also used oxytetracycline, but in comment Woodruff suggests that the results hardly justify the risk of proctitis and staphylococcal gastro-enteritis which may follow its use.

Sawitz and Karpinski (p. 1470) used a cyanide dye (Poquil) in children, giving it 3 times a day for 6 days (doses are given in the original abstract). The results were very good, and there were no serious side effects. Yeager (p. 1259) used a new compound. It appeared to be slightly more effective than piperazine citrate and adipate, but was more

disturbing. Details of composition and dosage are given in the original abstract. Results recorded by Sadun *et al.* (p. 1259), however, suggest that piperazine hexahydrate and phthalylsulphathiazole were more effective.

Avery (p. 1471) reports good results in children from a single dose of 125 mgm. promethazine hydrochloride.

Trichuris Infections, etc.

Ballesteros Bermudez and Burgos Courlaender (p. 1161) make the point that *Trichuris* can account for chronic diarrhoea of children, and that it can successfully be treated with hexylresorcinol enemas.

After trying 13 drugs or combinations of drugs in *Trichuris* and hookworm infections Hoekenga (p. 1454) concluded that none was uniformly successful, and that the best results were given by a mixture of tetrachloroethylene (2·7 ml.) and oil of chenopodium (0·3 ml.), or by hexylresorcinol.

The fourth recorded case of genuine human infection with *Capillaria hepatica* is reported by Ewing and Tilden (p. 784).

Trichinella Infections

In 2 investigations Kimsey and Adams (p. 643) found *Trichinella spiralis* in 11·2% and 20·8% of human diaphragms in Louisville hospital (U.S.A.) autopsy material.

In a series of papers on *Trichinella spiralis*, Gould *et al.* (p. 228) discuss insemination, the time of recovery of larvae from the blood of infected animals, and the effect of irradiation of the encysted larvae in pork, on animals which ingest them. Details should be sought in the original.

Norman *et al.* (pp. 644, 1371) used an acid-soluble protein antigen for a flocculation test for the diagnosis of trichiniasis, finding results similar to those given by the complement-fixation test with a crude larval antigen. The flocculation test is easy to perform and can probably take the place of the complement-fixation test.

Chute (p. 1040) has found that excretions and secretions of *Trichinella* larvae are antigenic and capable of producing immunity, and that the immunity acts on the larvae during migration or development in the muscles as well as on the intestinal stages.

Irradiation of pork to protect human beings and pigs against *T. spiralis* would mean that acquired immunity due to subclinical infections would be lost gradually; Magath and Thompson (p. 645) think that until a specific cure is found this procedure might be hazardous in view of the possible increase in severity of the disease, if acquired, which would follow this loss of immunity.

Cortisone treatment of mice immunized against *T. spiralis* rendered them essentially non-immune (Coker, p. 1041).

Gongylonema Infection

Feng *et al.* (p. 92) describe 2 cases of infection with *Gongylonema pulchrum* from China, and Rossi-Espagnet and Salera (p. 475) one from Rome. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Spencer, T. E. T., Spencer, Margaret, Jemesen, M. T. & Tommerup, J. W. J. **Malaria in the Mount Hagen Area.** *Papua & New Guinea Med. J.* 1956, Feb., v. 1, No. 4, 110–13.

It is commonly thought that there is no malaria in the highlands of New Guinea, but the authors report outbreaks in two localities, Koge and Rugi of the Mount Hagen station, which by its name and the context in which it is described appears to be in the highlands. Attention was drawn to the epidemics by the prevalence of upper respiratory tract infections in neighbouring hospitals, but preliminary investigation showed that malaria was prevalent and was the root cause of the trouble, with superadded respiratory infections; 78% of blood films taken in Koge were positive for *Plasmodium vivax*, *P. falciparum* or *P. malariae*, and 46% of those taken in Rugi were also positive. It a third area, Togaba, the rumours of an epidemic proved unfounded.

A reconnaissance of anopheline breeding disclosed *Anopheles annulipes* and *A. punctulatus farauti*, but it is suspected that *A. punctulatus punctulatus* was probably prevalent at the time of transmission of the disease. Probably malaria is endemic and sometimes epidemic in various parts of the Mount Hagen area and is being spread notably by the migration of labourers to and from farms and in connexion with the previous movement of troops. Methods of control by larvicidal or imagicidal attack, or by the distribution of prophylactic drugs, seem impossible and the solution of the problem lies in the multiplication of aid posts or dispensaries where treatment is freely available. *G. Macdonald*

Holstein, M. **Cytogenetics of** *Anopheles gambiae*. *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 2, 456–8.

Chromosome structure in a dieldrin-resistant strain of *Anopheles gambiae* from Sokoto in Northern Nigeria and a susceptible strain from

Lagos, Nigeria, were compared in colonies of each kept in a London laboratory. The dieldrin-resistant strain showed a great number of inversions in the chromosomes, some of which were not seen in the Lagos strain or another susceptible strain derived from it (Pavia strain). A great deal of further work is, as the author notes, called for to determine the extent to which such differences in the chromosomes may be associated with insecticide-resistance or due to other influences such as geographical, climatic or environmental factors. *D. S. Bertram*

Halcrow, J. G. **A New Sub-Species of** *Anopheles gambiae* **Giles from Mauritius.** *East African Med. J.* 1957, Apr., v. 34, No. 4, 133–5.

The author proposes the name *Anopheles gambiae litoralis* for the salt water *A. gambiae* which occurs only in Mauritius. Its eggs, larvae and pupae resemble those of *A. gambiae* but the adults possess 4 pale palpal bands almost constantly.

Larval habitats are remote from centres of human activity and do not occur inland; they are not affected by winter drought as they are fed from the sea and include crab-holes, depressions in coralline rocks, small tidal lagoons, small pools close to the tidal zone and salt-pans.

The adults are rarely found in animal or human shelters. Tests on stomach contents were positive for human and animal blood and in captivity the females will feed readily on both. The status of *litoralis* as a vector of malaria and filariasis is unknown. *H. S. Leeson*

Pringle, G. & Garrett-Jones, C. **Additions to the** *Anopheles* **Fauna of Iraq:** *A. sergenti* **Theobald and** *A. apoci* **Marsh.** *Bull. Endem. Dis.* Baghdad. 1957, Jan., v. 2, Nos. 1/2, 88–91.

"1. *A. sergenti* Theobald is reported from Iraq for the first time, breeding in desert springs west of Kerbela (approx. position: 32°40′N, 43°25′E).

"2. *A. apoci* Marsh is reported from Iraq for the first time: from Shubaicha, Kirkuk liwa (approx. position: 34°50′N, 44°15′E), and breeding in saline pools near Chia Surkh, Dyala liwa (34°35′N, 45°55′E)."

Garrett-Jones, C. **Migratory Flight in Anopheline Mosquitoes in the Middle East.** *Bull. Endem. Dis.* Baghdad. 1957, Jan., v. 2, Nos. 1/2, 79–87. [14 refs.]

During 2½ years' work in Lebanon with a WHO Malaria Demonstration Team the author accumulated evidence of migratory flights in *Anopheles sacharovi*, *A. superpictus*, *A. marteri* and *A. sergenti*. No clear evidence

was obtained on *A. claviger* or on *A. hyrcanus*, and *A. algeriensis* was not encountered as an adult.

It is contended that on present evidence it is not possible to determine the maximum or even average migratory range of any species and the author discusses the probability that, far from being an exceptional phenomenon, migration may prove to be the prevalent or even universal behaviour among the mosquitoes of the Middle East. *H. S. Leeson*

Bhatia, M. L. & Krishnan, K. S. **Malaria Vectors of India. IX. *A. culicifacies*, Giles, 1901.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Jan., v. 5, No. 1, 1–34, 1 diagram. [Numerous refs.]

The subjects covered in this condensed review of published information about *Anopheles culicifacies* are synonymy, distribution, breeding places, association of species, oviposition, swarming and mating, resting places, seasonal prevalence, density, longevity, biting time, flight range, altitude, hibernation and aestivation, anthropophilic index, maxillary index, relation to malaria, other infections and control. The bibliography includes 156 references to the literature and the list of recorded dissections totals 93.

Those interested in the anophelines of India will find this a useful summary of work on *A. culicifacies*. *H. S. Leeson*

Husain, M. Z. Y. & Talibi, S. A. **Incrimination of the Vector of Malaria in Federal Karachi Area (Pakistan). "A Record of Dissections of Anopheline Mosquitoes carried out by the Malaria Institute of Pakistan".** *Pakistan J. of Health.* 1956, July, v. 6, No. 2, 65–72. [10 refs.]

Federal Karachi comprises an area of 50–60 square miles at approximately 24°50′N. and 67°E. Epidemic malaria was found at two villages, where in 1950, 16 out of 19 children showed blood positive for *Plasmodium falciparum*, of which one was a mixed infection with *P. vivax*. Dissections of female *Anopheles* showed that *A. culicifacies*, although local in distribution, was the principal vector of malaria (80 out of 9,869 females dissected showing sporozoite infections). *A. stephensi* was the commonest *Anopheles* mosquito in the area, but no infected females were found in 23,223 females of this species dissected. *A. pulcherrimus* and *A. subpictus* were also recorded as common but again no females were found with sporozoite infections (out of 87 and 364 females dissected, respectively). The authors suggest that excessive rainfall was responsible for increased breeding of *A. culicifacies* which was followed by epidemic malaria. *B. R. Laurence*

Henry, A. F. X. Problème du contrôle de la prémunition chez des malades anciens paludéens. [**The Problem of the Control of Premunition in Chronic Malaria**] *Riv. di Malariologia.* 1956, Dec., v. 35, Nos. 4/6, 231–40. [11 refs.]

Fluctuations in the degree or efficiency of premunition in malaria may lead to the necessity of treatment, but this must be preceded by a full examination of the patient in order to elicit all the factors involved. Many such chronic cases have a "polyetiology", and the author employs such terms as amoebo-paludism, malarial alcoholism, etc. Various physical factors may also disturb premunition, such as fatigue or accident. Loss of premunition becomes evident in the greater positivity of the author's melano-flocculation test or the porphyro-flocculation reaction (the technique of which is given in detail); also in hypotension and hypocholesterinaemia. *P. C. C. Garnham*

Soberón y Parra, G. Hechos sobresalientes en la clínica y en el tratamiento del paludismo. [**Special Features of the Clinical Aspects and Treatment of Malaria**] *Gac. Méd. de México.* 1956, Nov.–Dec., v. 86, No. 6, 387–400. [58 refs.]

Smith, C. C. & Ihrig, Jean. **The Pharmacological Basis for the Prolonged Antimalarial Activity of Pyrimethamine.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 50–57.

The prolonged antimalarial activity of pyrimethamine has been well established by the work of Coatney *et al.* [this *Bulletin*, 1954, v. 51, 9], and was ascribed to the formation of metabolic products which were retained for a long period in the body [*ibid.*, 1953, v. 50, 85]. The fate of the drug has now been studied in 8 human volunteers for 16 days after dosages of 25 or 50 mgm. twice daily for 2 days, and in monkeys receiving 5 mgm. per kgm. once daily for 2 days. Tests were made to find whether folic acid antagonists were responsible for antimalarial activity. The amount of drug present in the serum at intervals up to 7 days was also determined. The chemical method of estimation was essentially that of Schmidt *et al.* [*ibid.*, 1953, v. 50, 481] and the biological method that of Hitchings *et al.* [*ibid.*, 85].

The results of the two methods were in fairly good agreement indicating that the same substances were being estimated by each. It appeared that detectable excretion of drug continued in the urine of man for 11 days and pyrimethamine was present for 7 days in serum. The corresponding periods for detection in rhesus monkeys were respectively 7 and 5 days. In urine the greatest excretion occurred in the first few days. The pyrimethamine retained was sufficient to account for protection against infection with *Plasmodium vivax* or *P. cynomolgi*,

respectively, and there was no essential difference in the fate of the drug in the two hosts. The need to postulate the formation of more active folic acid antagonists was not apparent to the authors.

J. D. Fulton

Young, M. D. **The Response of *Plasmodium malariae* Infections to Pyrimethamine (Daraprim).** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 223–4.

"Pyrimethamine was tried 17 times against *Plasmodium malariae* (USPHS strain) infections in 15 neurosyphilitic patients. The drug was given on one or two days in amounts totalling 25, 50, or 100 mgm. The response of the erythrocytic parasites was comparatively slow with a median of 12 days to clearance in 14 patients. Of 11 patients with an adequate follow-up, seven relapsed. Two patients who had relapsed after 25 mgm. were treated with 50 mgm. The latter dose failed to eliminate the erythrocytic parasites."

[See this *Bulletin*, 1948, v. 45, 680.]

Russell, P. F. **Malaria in the World Today.** *Amer. J. Pub. Health.* 1957, Apr., v. 47, No. 4, Pt. 1, 414–20.

Careful estimate suggests that there are some 1,070 million people exposed to malaria, of whom some 375 million are now protected by effective control schemes. There still remain, however, a large number who are unprotected and there are perhaps some 200 million cases of clinical malaria in a year. The concept of attack on the disease has changed from control to eradication, in which there are four stages: the preparatory stage is one of survey and assembly of staff and materials, lasting about a year; in the stage of attack there is universal imagicidal control, practised for about 3 years and intended to interrupt transmission completely and virtually empty the reservoir of infective cases; the stage of consolidation is one during which an active search is made for residual cases and foci, and it continues until the complete freedom has been demonstrated for 3 years. It is succeeded by the stage of maintenance when malaria control becomes one of the routine activities of the public health service and is chiefly designed to prevent the re-importation of the disease.

Examples of the success of this mechanism can be seen in Venezuela, Italy and parts of Ceylon, and there are now schemes in the consolidation phase with eradication practically complete in Barbados, Corsica, Chile, Cyprus, French Guiana, Italy, Mauritius, Puerto Rico, and the United States, while in the following countries the attack phase is well advanced: Antigua, Argentina, British Guiana, Ceylon, El Salvador, Greece, La Réunion, Lebanon, Panama Canal Zone, Rumania, Swaziland, Taiwan, Thailand, Tobago and Venezuela. 24 other countries are in an early

phase of the stage of attack and 7 more have embarked on the preparatory mechanism.

There are, however, still very considerable problems to be overcome. The resistance of anophelines to insecticides is of paramount importance, whereas our knowledge of it and the extent of the research undertaken on it is far smaller than its importance justifies. International concern in the executive side of the campaigns is very large indeed. The 1956 malaria budget of WHO, to which much of the initiative is due, was $309,000. The Pan-American Sanitary Bureau set aside $100,000, UNICEF contributed $6,600,000, while the United States in addition to its large contributions to international agencies supported eradication schemes to the extent of $14 million during that year. Research, however, is not being fostered on a comparable scale. Interest in it has declined with the disappearance of the disease from the USA but sight should not be lost of the enormous indirect costs of malaria to a country which trades very largely with the malarious world, and which must therefore carry a part both of the cost of malaria and of its control. It would be to such a country's advantage to protect its investments by giving much more support to malaria research without which it seems reasonable to predict that world-wide malaria eradication will be impossible. With the proper development of skills, however, malaria eradication is possible. *G. Macdonald*

Swellengrebel, N. H. & Kraan, H. **Malaria Control in the Province of North-Holland.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 263–9, 2 graphs.

Malaria in north Holland, as shown by imperfect records from 1849 onwards and precise data from 1900 to the present day, has been at a low grade of endemicity on which there has been superimposed a periodic epidemic with a 20-year cycle, with outbreaks in 1857–9, about 1880, 1900–2, 1918–21, and 1944–7. Since 1948 malaria has very greatly declined and now even a careful sentinel service has great difficulty in finding any cases.

The authors review the possible causes of the periodicity of the disease and of its recent decline. Anophelines are known to have been very numerous at the time of the 1918–21 epidemics and have since then greatly decreased in numbers, but their fluctuations have not coincided with fluctuations in malaria and cannot be taken as a cause of the periodicity. The recent decline in anopheline numbers is remarkable; it cannot be attributed to deliberate control and probably not to the agricultural use of insecticides. The change in the salinity of water in the "polders" would seem to provide an attractive explanation for the decrease of *Anopheles m. atroparvus* but for the fact that it is not matched by an associated increase in *A. m. messeae* as has been confidently expected. The existence of some unknown or *x* factor has

been postulated in East Friesland and perhaps may be called into explanation here. At first it would seem hard to attribute periodicity of malaria to changes in communal immunity because only a small fraction of the population is affected, but it becomes less difficult when it is remembered that the disease is confined to small foci in which most of the people are affected, and though the cause of periodicity is not known immunity may have some influence on it.

Control of malaria has been practised since 1920 and refined at intervals, now consisting of the selective spraying of particular localities with residual insecticides and the deliberate search for residual cases of the disease through a sentinel service charged with this function. The operation of this service would seem to explain the decline of malaria since 1948 but this cannot be confidently maintained because that decline is only a moderate improvement on similar happenings before.

G. Macdonald

RAFFAELE, G. **Malaria Eradication in Italy; some Nosological Observations.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 208–13.

Malaria in the province of Frosinone has decreased in a manner comparable to that in the whole of Italy, where cases have declined in number from 411,602 in 1945 to 21 in 1955, when only 3 cases were thought to be primary and indigenous. In Frosinone control took the form of imagicidal attack and careful record and treatment of infected persons, each of whom received either 3 × 0·5 gm. or 4 × 0·3 gm. mepacrine. Cases of *P. vivax* malaria in the years 1946 to 1949 numbered 6,527, 1,254, 21 and 2, while cases of *P. falciparum* malaria numbered 734, 16, 0, 0, and mixed infections were 270, 3, 0, 0.

It can be taken that transmission was fully interrupted at a very early stage and the relapse pattern of the disease can therefore be followed in individuals from the time of the start of control. Among the *P. vivax* cases 12·6% had one relapse, 3·4% had 2, 1·0% had 3, 0·3% had 4, 0·16% had 5 and 0·01% had 6 relapses. The timing of these relapses is analysed. There is some inverse relationship between the time separating relapses and the number to be expected. The latent period between relapses tended to be either under 4 months or from 7 to 10 months with a few in the intermediate period. In some cases latent periods of 12 to 14 months were observed but there was only one person in whom the total period of infection, 32 months, exceeded 2 years. It is to be remembered that all cases including relapses were treated promptly and this pattern may not be that seen under truly natural conditions. Only 32 of 619 *P. falciparum* cases relapsed once and 2 twice.

The author considers that the relapse pattern can best be explained on the hypothesis that there is a secondary exo-erythrocytic phase of *P. falciparum* which is, however, susceptible to treatment by antimalarial

drugs; experience shows that blood-induced *P. falciparum* infections are readily cured by quinine, sporozoite-induced infections treated by quinine suffer numerous relapses, while sporozoite-induced infections treated with mepacrine suffer few relapses. This combination would be unlikely if, as is commonly thought, there were no secondary exo-erythrocytic phase of this parasite. *G. Macdonald*

De Zulueta, J., Jolivet, P., Thymakis, K. & Caprari, P. **Seasonal Variations in Susceptibility to DDT of *Anopheles maculipennis* in Iran.** *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 2, 475–9.

Measurements of normal susceptibility levels, for detection of insecticide resistance in mosquitoes, are now considered important and data are accumulating [see this *Bulletin*, 1957, v. 54, 885]. However, as the authors of this paper remark, the effect of seasonal changes in the susceptibility of normal mosquitoes to residual insecticides has not yet received the attention it deserves.

A series of tests on *Anopheles maculipennis* were made recently in Iran, by means of the Busvine method (WHO Technical Report Ser. No. 80, 1954, 30; this *Bulletin*, 1954, v. 51, 1028). Very striking differences were found between the summer females with full ovarian development and females entering hibernation.

Locality	*Median Lethal Concentration (% DDT)*	
	July–Sept.	*October*
Lotleil (Caspian)	0·9	16·4
Isfahan (Julfa district)	1·8	6·0
Isfahan (near river)	2·3	6·7

The authors suggest that the great rise in resistance may be associated with increased lipids due to fat body development. They discount the effects of the difference of temperature between the summer and autumn tests, which were about 8°C. in Lotleil and 3–4°C. in Isfahan, during the tests and perhaps rather more during the observation period. [It is not certain that these differences should be disregarded. Insecticidal action is rather sensitive to temperature change.] *J. R. Busvine*

Ramakrishna, V. & Elliott, R. **Normal Resistance-Level of *Anopheles funestus* Giles to Insecticides.** [Correspondence.] *Nature.* 1957, June 1, v. 179, 1140–41.

Wild-caught blood-fed and gravid females of *Anopheles funestus* from Sokoto Province, Northern Nigeria, were tested for susceptibility to DDT, gamma BHC and dieldrin. The mosquitoes were collected about 10 miles west of the sprayed zones of the Malaria Control Pilot Project in the province. With the standard test of Busvine [this *Bulletin*, 1954,

v. 51, 1028] median lethal concentrations were 1·32% for DDT, 0·0033 for gamma BHC, and between 0·05% and 0·1% for dieldrin.

Compared with previous tests of *A. gambiae* [*ibid.*, 1956, v. 53, 857; 1957, v. 54, 124] it appears that *A. funestus* is less susceptible to DDT but more susceptible to the other two insecticides than *A. gambiae*. The variable susceptibility to dieldrin shown by *A. funestus* in these observations awaits clarification. It is noted that the dieldrin-treated zone of the pilot project is adjacent to the area of collection of the material; selection of strains of different tolerance may have occurred in the control area (where the species still exists) and may be affecting the composition of the *A. funestus* fauna in the collection area.

D. S. Bertram

Mastbaum, O. **Past and Present Position of Malaria in Swaziland.** *J. Trop. Med. & Hyg.* 1957, May, v. 60, No. 5, 119–27, 5 graphs. [11 refs.]

Swaziland is land-locked, sub-tropical and has a seasonal rainfall with its maximum in January. The country falls naturally into three areas: the highveld in which malaria is sometimes epidemic (though usually absent), the middleveld in which it is moderately endemic and the bushveld in which it is highly endemic. In these last two areas the disease occurs as a seasonal outbreak between February and June, it is carried by *Anopheles gambiae* and *A. funestus*; the principal parasite is *Plasmodium falciparum* which accounts for 90% of infections, *P. vivax* and *P. ovale* accounting for the remainder.

The results of detailed surveys carried out in 1945–6 are recorded and include the observation that infants aged 7–12 months show considerably greater densities of parasites than those aged 1–6 months, and that gametocyte rates decline no more rapidly in the highly endemic areas than in the moderately endemic ones, from which it is concluded that immunity may not play a great part in the diminution. Control has been carried out since 1949–50 and now covers almost all people exposed to malaria, numbering about 130,000, who are protected by the imagicidal use of BHC, of which 1 or 2 applications are made annually. Assessment of results shows that in the unirrigated parts of previously highly endemic bushveld none of 1,322 infants aged 1–12 months showed a positive blood film, and only 15 of 2,248 aged 1–5 years. In irrigated areas none of 112 infants aged 1–12 months were positive but 9 of 244 aged 1–5 years were.

It is concluded that throughout most of the area transmission has been completely ended but this has perhaps not been absolutely achieved in irrigated areas. It also appears that *A. funestus* has been eradicated though *A. gambiae* remains. No sign of anopheline resistance to insecticides has been seen.

The programme has reached the stage where spraying has been discontinued in a considerable part of the middleveld and this policy will be extended. The costs are analysed and amount to 19·8 pence per person actually protected against the disease per annum.

An interesting experiment in drug prophylaxis is recorded. A group of people living on the frontier and constantly visiting uncontrolled areas were not protected by imagicides. They were given a single dose of 300 mgm. chloroquine base followed by 25 mgm. pyrimethamine once a month throughout the season, with half doses for children under 5. Examination after 5 months showed that the parasite rate had fallen from 46% to 2% and no infants were found infected. These encouraging results are to be followed by further trials to ascertain whether malaria can be completely eradicated with these small doses of drugs.

G. Macdonald

Chakrabarti, A. K. & Singh, N. N. **The Probable Causes of Disappearance of *A. minimus* from the Terai Area of the Nainital District of Uttar Pradesh.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Mar., v. 5, No. 2, 82–5. [14 refs.]

In Naini Tal Terai of Uttar Pradesh the chief vector of malaria was *Anopheles minimus* but the density of the species has decreased since 1948 and no adults or larvae have been seen since 1951 though other anophelines are present. The authors have sought to find an explanation for this disappearance.

Since 1948, 60% of the jungle has been brought under the plough and deforestation, cultivation and intensified malaria control by residual indoor spraying of DDT have proceeded side by side; but though *A. minimus* is absent *A. fluviatilis* persists and has become chief malaria vector.

It has recently been observed [this *Bulletin*, 1954, v. 51, 769] that where a vector of malaria occurs at the periphery of its dispersion range or in a region which is not its normal habitat, it is particularly susceptible to chemical control or even eradication.

It is therefore suggested that, as Naini Tal Terai can be assumed to be the periphery of dispersion of *A. minimus*, its disappearance from this area may be due to its failure to adapt itself to conditions in foreign surroundings or to the environment at the limit of its geographical range, especially during the great changes brought about by the rapid development and its accompanying malaria control methods of recent years.

H. S. Leeson

Sharma, M. I. D. & Krishnamurthy, B. S. **Development of Resistance to DDT in *A. subpictus* Grassi, 1899, in a Delhi State Village.** [Research Notes.] *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Jan., v. 5, No. 1, 78.

Vargas, L., Díaz Nájera, A., Román, G. & Almaraz, A. Observaciones sobre pruebas de susceptibilidad de *Anopheles mexicanos* al DDT. [**Observations on Tests for Susceptibility of Mexican Anophelines to DDT**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1956, Sept., v. 16, No. 3, 39–49. English summary.

The authors undertook to establish susceptibility levels, towards DDT, of various anophelines which are important in the transmission of malaria in Mexico. Over 16,000 mosquitoes were used in the tests, some reared in an insectary, others captured in the field. The test method tried first was that of Fay *et al.* [this *Bulletin*, 1954, v. 51, 122]. However, several disadvantages were observed, notably:

(1) crystals of DDT were dislodged from the treated papers when mosquitoes were blown into and out of the exposure tubes;
(2) the mosquitoes were sometimes injured by the method of transfer; and
(3) they often escaped during the process;
(4) it was difficult to observe the kills in the recovery tubes, which are opaque;
(5) the mosquitoes sometimes rested on the untreated wire mesh ends of the exposure tubes and this seems to involve a possible error.

For these reasons the authors used their own technique. Exposures were made in small (13 cm. cube) cages of voile, which were first impregnated by dipping them in a xylene solution of DDT. After draining and drying the voile chamber was attached to a simple rod framework, to form the cage. The mosquitoes were transferred to the exposure cages and afterwards to clean recovery cages, by sucking tubes. Exposures of 3 to 30 minutes were employed and three deposit rates of DDT (0·15 to 0·64 gm./sq. m.) were used. Results are given in tables for: *Anopheles aztecus*, *A. albimanus*, *A. quadrimaculatus* and *A. pseudopunctipennis*.

[The method described does not seem to be a great improvement on that of Fay *et al.* For example, it is difficult to see why the use of "sucking tubes" did not damage the mosquitoes as much as simply blowing them from one cylinder to another. The present results are not comparable with those of any other workers, since no one else has used this particular technique.] *J. R. Busvine*

Floch, H. La lutte antipaludique en Guyane Française. Notre huitième campagne de pulvérisations d'insecticides à effet rémanent dans les habitations. [**Malaria Control in French Guiana. Eighth Campaign of Residual Spraying of Houses**] *Arch. Inst. Pasteur de la Guyane Française et de l'Inini. Publication No. 404.* 1956, Aug., 80 pp., 5 figs. [69 refs.]

The author reviews the campaigns for the control of malaria and yellow fever in French Guiana under 23 headings, giving much material culled

from other parts of the world which would enable local officials to understand their problems in a world context.

It may be recalled from previous reports [this *Bulletin*, 1957, v. 54, 130] that after an imagicidal campaign *Anopheles darlingi* had been virtually eradicated, and malaria had disappeared. The disease, however, recurred and it was found to be associated with immigrant labourers from the Antilles and probably transmitted by *A. aquasalis*. These labourers have therefore been directed through a single port of entry, Cayenne, and there subjected to treatment with camoquin and Rodoprèquine as previously described. The general measures of malaria control were impeded by a delay in the granting of funds; the mechanism and effects on the programme are explained with pleasing clarity. In the result conditions were much as in the previous year: 59 fresh cases of malaria were discovered, compared with 57 in 1954.

Among the many other notes of matters of interest is a record of the development of resistance to DDT by the bed-bug *Cimex lectularius*.

G. Macdonald

Kunert, H. & Werner, H. Über den Durchtritt von *Plasmodium berghei* durch die experimentell geschädigte Zottenhaut (Chorionektoderm), ein Beitrag zur congenitalen Malaria. [**Penetration of** *Plasmodium berghei* **through Experimentally Damaged Chorionic Membrane: Contribution to Congenital Malaria**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 168–74.

One of the authors has previously shown that *Plasmodium berghei* was incapable of penetrating through intact embryonic membranes [this *Bulletin*, 1956, v. 53, 1221]. In the present paper an account is given of experiments designed to ascertain whether congenital infection of the embryo could be produced artificially, by damaging or reducing the defence mechanism of the chorionic membrane. For this purpose pregnant mice at different periods of gestation were (1) inoculated intraperitoneally with 8–10 million parasites and (2) injected with 0·0025–0·003 gm. of euphyllin (theophyllin-ethylendiamine) in 0·75 cc. saline. The experimental animals comprised 10 female mice with 71 foetuses treated in the 2nd third of the period of gestation and 16 females with 65 young ones treated in the last third. Investigations carried out between the 1st and 4th days after administration of euphyllin revealed the presence of parasites in 12 foetuses and 7 young mice from mothers treated with the drug during the 2nd and last thirds respectively of the period of gestation.

These experiments confirmed the contention that congenital malaria infection only takes place if the embryonic membranes are damaged.

C. A. Hoare

Raymond-Hamet. La cinchonamine et l'aricine ont-elles une influence sur l'infection de la souris par le *Plasmodium berghei* Vincke et Lips? [**The Influence of Cinchonamine and Aricine on the Development of *P. berghei* in the Mouse**] *C.R. Soc. Biol.* 1956, v. 150, No. 11, 1883–5.

The author considered it of interest to test against *P. berghei* infections in mice two of the minor cinchona alkaloids, cinchonamine $C_{19}H_{24}ON_2$ and aricine $C_{23}H_{26}O_4N_2$, which unlike quinine do not possess a quinoline nucleus. The methods employed were those of Schneider *et al.* [this *Bulletin*, 1950, v. 47, 325]. Batches of 9 mice were used in each experiment, 3 served as controls and 3 others were treated subcutaneously daily for 5 days with these two compounds starting on the day after infection. The doses of cinchonamine used were 0·5 to 1 mgm. per 20 gm. mouse, while those for aricine ranged from 0·2 to 5·0 mgm.

The results given in tables show that the former even in toxic doses was without action and aricine had to be given in toxic doses to produce a moderate effect on parasite increase. *J. D. Fulton*

Wolcott, G. B. **Chromosome Studies in the Genus *Plasmodium*.** *J. Protozoology.* Utica. 1957, Feb., v. 4, No. 1, 48–51, 5 figs. [12 refs.]

The author has previously shown that the nucleus in the 4 human malaria parasites possesses 2 chromosomes of unequal length, representing a haploid complement [this *Bulletin*, 1956, v. 53, 143]. In the present paper he describes the chromosome constitution of 5 other species of *Plasmodium*: *P. knowlesi* from macaque monkeys, *P. floridense* from lizards, *P. berghei* from mice, *P. lophurae* from ducks and 2 strains of *P. relictum*, from pigeons and canaries. The nuclear structure of these parasites, which was studied in living condition by phase contrast microscopy, is depicted in photomicrographs.

In all these species the nucleus was visible only in presegmenting schizonts and merozoites; it appeared to be devoid of a nuclear membrane and contained 2 chromosomes: these were of unequal length (as in the human parasites) in *P. knowlesi*, and of equal length in the saurian and avian parasites, *P. floridense*, *P. lophurae* and *P. relictum*, as well as in *P. berghei*. On the basis of difference in chromosome constitution, the species of *Plasmodium* thus appear to fall into 2 groups: (a) with 2 equal and (b) 2 unequal chromosomes. *C. A. Hoare*

McGhee, R. B. **Comparative Susceptibility of Various Erythrocytes to Four Species of Avian Plasmodia.** *J. Infect. Dis.* 1957, Jan.–Feb., v. 100, No. 1, 92–6.

The author has previously shown that the erythrocytes of certain birds and mammals could be infected with *Plasmodium lophurae* [this

Bulletin, 1949, v. 46, 912; 1950, v. 47, 1184]. In the present paper an account is given of a study on the susceptibility of the red corpuscles of pigeons, canaries, ducks, chickens, rats, mice and rabbits to invasion with 4 avian parasites, *P. gallinaceum*, *P. lophurae*, *P. circumflexum* and *P. cathemerium*, the first three of which were maintained in chick embryos and the last in duck embryos. In these experiments, embryos infected with the appropriate parasites were inoculated intravenously with washed erythrocytes of the animal to be tested, and after 4 and 24 hours the parasitized foreign cells were counted, and the percentage of merozoites within them served as the index of their susceptibility. All the erythrocytes could be readily differentiated from those of the embryo donor, with the exception of those from the chick, which were identified serologically.

It was found that all avian erythrocytes were susceptible in various degrees to invasion by the 4 species of *Plasmodium*. While *P. lophurae* also infected the cells of rabbit, mouse and baby rat, *P. circumflexum* was only able to infect the cells of one mammal, *viz.*, baby rat. *P. cathemerium* was not so infective to avian cells, and only exceptionally invaded those of adult rats, whereas the invasiveness of *P. gallinaceum* was the most restricted in that all avian cells—except those of the chick—were only slightly infected, but mammalian cells were refractory. The findings suggest that the invasion of erythrocytes is not effected by active penetration of the parasites but through a physico-chemical mechanism. In the author's words it is logical to assume that "substances are elaborated by the parasite which act against a specific material in the erythrocyte, thereby promoting invasion". *C. A. Hoare*

Rossan, R. N. **The Effect of Antimalarial Drugs on the Exoerythrocytic and Erythrocytic Stages of Blood-Induced Infections of** *Plasmodium fallax* **in the Turkey.** *Exper. Parasit.* New York. 1957, Mar., v. 6, No. 2, 163–88, 7 figs. [20 refs.]

Exoerythrocytic stages of *Plasmodium fallax* can arise after inoculation of turkeys with infected blood from a donor bird as well as from sporozoite inoculation as is the case with *P. gallinaceum*. Turkey poults approximately one week old weighing about 80 gm. were inoculated intravenously with approximately 4 million parasites. 10 drugs were tested against the resultant infections and included quinine, quinacrine [mepacrine], chloroquine, four 8-aminoquinolines, pyrimethamine, chlorguanide [proguanil] and sulphadiazine, in high and low dosage, based on host body weight. Twice-daily oral treatment was given over a period of 4 days in 0·5 ml. volumes starting a few hours before inoculation. The effect of quinine on infection was employed as a standard for purposes of comparison in each series in which untreated hosts were also used, to include in all approximately 300 birds. In order to follow the course of infection

stained blood smears were examined regularly and the degree of infection recorded as the number of parasites per 10^4 erythrocytes. The brain and other tissues were examined by the methods of Huff and Coulston [this *Bulletin*, 1945, v. 42, 538].

The course of infection in untreated birds followed a regular pattern. Death due to exoerythrocytic forms occurred to the exent of 25% to 95% in different tests. Parasitaemia was observed earliest in birds receiving chloroquine. Quinacrine cleared the blood of parasites most quickly and pyrimethamine most slowly. Isopentaquine in the doses given was the best suppressant. There was no evidence that any of the drugs could prevent the appearance of exoerythrocytic forms in the brain. In this connexion studies with other tissues were less conclusive. The author is of the opinion that the host-parasite relationships in this particular infection are satisfactory for accurate assessment of the influence of drugs, in contrast to the infection of *P. gallinaceum* in the chick in which the formation of exoerythrocytic stages is less predictable.

It has not been possible to compare closely the results of other workers in this type of investigation either because of the varying host-parasite relationships or the differences in methods employed. From the discussion it emerges that only Pamaquin, sulphadiazine, chlorguanide and a combination of primaquine and pyrimethamine are effective against exoerythrocytic stages in other blood-induced avian malarias. Against *P. fallax* only the 8-aminoquinolines pamaquin, pentaquine and isopentaquine possessed this property. Unlike those of *P. gallinaceum* in the chick the exoerythrocytic forms of *P. fallax*, if not suppressed, caused death of the host. These forms are not detectable in tissues until at least 13 days after inoculation, regardless of the intensity of the blood infection. Immunity to re-invasion of the blood from exoerythrocytic sources was greatest in untreated birds.

[There is much detail in the paper which has not been abstracted and will require to be read in the original.] *J. D. Fulton*

Schinazi, L. A. **Observations on a Fast-Moving Protein in Avian Malarial Serum.** *Science*. 1957, Apr. 12, v. 125, 695–7, 2 figs.

Many papers have described the change in electrophoretic pattern of proteins as the result of malaria infection, but none of these changes have been of a qualitative nature. In this preliminary report a marked qualitative change is described in the sera of pigeons infected with *Plasmodium relictum*, which is due to the presence of a substance with greater electrophoretic mobility than albumin. 40 microlitres of the serum were applied to Whatman No. 1 filter paper immersed in veronal-acetate buffer of *p*H 8·6 and ionic strength 0·1, and a constant current of 0·5 micro-amps per cm. of paper was applied for 19 hours at 23° to 25°C. The paper was dried in air and then at 70°C. for 2 hours, and

subsequently stained with brom-phenol blue for proteins and with Oil Red O for lipids and analysed for density.

The new component was not characteristic of malaria serum in general, and appeared only transiently in this particular infection. It was present in maximal amount and was best separated from albumin a few days after the occurrence of peak parasitaemia. Its presence seemed to be correlated with stimulation of erythropoiesis. The appearance of a similar component also occurred when haemolytic anaemia and erythroblastosis resulted from administration of phenylhydrazine to an uninfected host. This fast-moving lipoprotein exhibited a blue fluorescence and stained readily for lipid. *J. D. Fulton*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:*—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

Amrein, Y. U. **Evidence against Sexuality in** *Trypanosoma gambiense*. *J. Protozoology.* Utica. 1957, Feb., v. 4, No. 1, 67–8. [11 refs.]

In view of the controversy regarding the existence of sexuality in trypanosomes and because it had previously been studied chiefly from the morphological point of view, the author carried out an investigation of this phenomenon by mixing 2 different drug-resistant strains of the same trypanosome, in order to ascertain whether there occurred a genetic transfer of drug resistance between these strains.

For this purpose cultures of *Trypanosoma gambiense* were rendered resistant to 2 drugs, suramin and tryparsamide, with the result that 2 substrains were obtained, which tolerated concentrations about 20 and 3·6 mgm. per total medium of the 2 drugs, respectively. In order to provide conditions for sexual phenomena to manifest themselves, the two substrains were mixed and grown in several subcultures in the absence of drugs, as well as in media with various concentrations of the 2 drugs together. In the course of these experiments the individual substrains could be re-isolated by subculture into media containing the corresponding drugs. If syngamy had occurred between flagellates of the two biochemically distinct populations, one would expect to obtain the transmission of resistance from one substrain to the other. However, the mixed drug-resistant substrains did not survive as long nor grow as well as the

individual drug-fast substrains, when cultivated separately with their respective drugs. Moreover, neither of these substrains had been lost during the transfers, nor had their specific resistance diminished. Hence it is concluded that neither genetic exchange nor transmission of resistance between them had taken place. However, it is [rightly] noted that the evidence against the existence of sexuality produced in this paper applies only to the *in vitro* phase of *T. gambiense* [*i.e.*, not to its blood forms].

C. A. Hoare

Hoare, C. A. **The Spread of African Trypanosomes beyond their Natural Range. (Essay on Historical Zoogeography of the Host-Parasite System).** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 157–61, 1 fig. [10 refs.]

This paper deals with the zoogeography of *Trypanosoma vivax* and *T. evansi* in particular relation to the mode of origin of these species. *T. vivax* is transmitted by tsetse flies and its distribution is normally limited to areas where these flies occur; it can break its bounds when mechanically transmitted by horse-flies and in this way has spread from tropical Africa to Mauritius, the West Indies and South America, where it has lost the power to develop cyclically in its original host. *T. evansi* probably arose when camels strayed into the tsetse belts of Africa and became infected with *T. brucei*; on their return to the North, the trypanosome became adapted to mechanical passage by other biting flies, lost to a large extent its polymorphic characters and entirely its transmissibility by *Glossina*. *T. evansi* then spread to all countries where the one-humped camel occurs (a map of the Old World shows clearly the degree of overlapping); other domestic animals then caught the infection which extended to Indo-China, Java, Philippines and Mauritius, and finally to the New World. [The legends in Fig. 1 relating to Surra and camels have been transposed.] *P. C. C. Garnham*

Bellelli, L. & Pirlo, F. Castellanosi (*Tripanosomiasi*) sperimentali della cavia da *Castellanella evansi* (*Trypanosoma evansi*): alterazioni ematologiche e del midollo osseo. [**Changes in the Blood and Bone-Marrow of Guineapigs Experimentally infected with** *Trypanosoma evansi*] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1957, Mar., v. 38, No. 3, 145–68, 2 figs. [23 refs.] English summary.

Asō, T. [**Experimental Studies on Adsorption by** *Trypanosoma lewisi* **of Antigenic Substance from** *Proteus OX19*] *Igaku Kenkyu.* Fukuoka. 1957, Mar., v. 27, No. 3, 483–500, 6 figs. [77 refs.] [In Japanese.] English summary.

The object of these experiments was to demonstrate possible variations in the antigenicity of *Trypanosoma lewisi*, which was used instead of erythrocytes to adsorb heterogenous bacterial antigenic substances in the Middlebrook-Dubos tests.

Bacterial bodies of *Proteus OX19* were suspended in 20% distilled water and placed in the refrigerator and in the incubator on alternate days for a week, when the suspension was heated for 1 hour at 100°C. and centrifuged. The supernatant (V-extract) was divided into a polysaccharide fraction (K-F) and a protein fraction (E-F) by trichloracetic acid and alcohol precipitation: from 150 gm. wet bacterial bodies 1·6 gm. E-F and 0·45 gm. K-F were obtained. In rabbits immunized with the extract it was shown to contain sufficient specific antigen from *Proteus OX19* to give positive Weil-Felix, precipitation, haemagglution and haemolysis tests.

Living *T. lewisi* from an infected rat and suspended in saline or Ringer's solution with 1% glucose were sensitized for 24 to 48 hours at 24° to 26°C. with the extract and its fractions (V-extract, 0·05 to 0·2 ml.; 0·5% E-F and 0·5% K-F, 0·3 to 0·5 ml.; to 1·0 ml. trypanosome suspension). Sera of rabbits immunized with the bacterial bodies or the V-extract, gave typical agglomeration of the sensitized trypanosomes in titres of 1 in 4 to 1 in 32: similar results obtained with sera of typhus patients giving a positive Weil-Felix reaction. Also, sera of rabbits immunized with the sensitized trypanosome bodies had precipitins for the V-extract and fractions and agglutinins for the Weil-Felix reaction (1 in 32 to 1 in 128), and also haemagglutination and haemolytic antibodies.

The E-F fraction showed higher antigenicity than the K-F fraction, "problematically speaking, in the property to be adsorbed by blood corpuscles and protozoan cells". *H. J. O'D. Burke-Gaffney*

David, A. & Satya Prakash. **Susceptibility of Dog to a Natural (Cryptic) Infection of Trypanosomes in Sparrows** *Passer domesticus*. [Research Notes.] *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Mar., v. 5, No. 2, 117–19.

See this *Bulletin*, 1956, v. 53, 161.

Díaz Alcayaga, María. Distribución del ácido desoxiribonucleico en *Trypanosoma cruzi*. [**Distribution of Deoxyribonucleic Acid in** *Trypanosoma cruzi*] *Biológica*. Santiago. 1955. v. 21, 90–97, 17 figs. on 2 pls. [11 refs.] English summary.

Rubio D., Mafalda. Estudio de una cepa de *Trypanosoma cruzi* aislada de triatomideos de una localidad del Sur del Perú. [**Study of a Strain of *Trypanosoma cruzi* Isolated from Triatomids in an Area in South Peru**] *Biológica*. Santiago. 1955, v. 21, 59–72, 1 graph & 4 figs. [14 refs.] English summary.

Rubio D., Mafalda. Influencia del acetato de cortisona sobre la virulencia y localización tisular de una nueva cepa de *Trypanosoma cruzi*. Estudio de la persistencia de los cambios observados. [**Influence of Cortisone Acetate on the Virulence and Tissue Localization of a New Strain of *Trypanosoma cruzi***] *Biológica*. Santiago. 1955, v. 21, 75–89, 2 graphs & 11 figs. on 2 pls. [23 refs.] English summary.

Pizzi P., T. & Chemke S., J. Acción de la cortisona sobre la infección experimental de la rata por *Trypanosoma cruzi*. [**Action of Cortisone on Experimental *Trypanosoma cruzi* Infection in Rats**] *Biológica*. Santiago. 1955, v. 21, 31–58, 1 graph & 19 figs. on 10 pls. [60 refs.]

The English summary appended to the paper is as follows:—

"The authors made a study to investigate the mechanisms by which cortisone increases the severity of *Trypanosoma cruzi* infections in rats. A highly virulent and standardized strain of the parasite and inbred rats of the A/C strain were used. Two different doses of the hormone were administered from the onset of the infection (with appropriate controls) and analyses of the tissue changes, parasitemias and antibody titers were performed.

"The main results may be summarized as follows:

"1. High doses of cortisone intensified experimental Chagas' disease in rats. Animals that were administered the hormone developed an acute disease, with rapidly increasing parasitemias and death within 14 days, whereas the controls survived indefinitely, with two rises in parasitemia, each one followed by a parasitic crisis.

"2. Histopathologically, a more intensive parasitic invasion of the tissues could be observed, as well as a less intensive inflammatory reaction and more pronounced involutions in the lymphatic organs of cortisone-treated animals, as compared to the controls.

"3. The aggravating action of cortisone in our experiments can be explained by the following interacting factors: a) acceleration of the reproductive cycle of the parasite; b) inhibition of the defensive inflammatory reaction; c) decrease of the phagocytic capacity of the inflammatory macrophages; and d) lowering of the titres of 'non-lytic' antibodies that pláy a role in immunity.

"4. Smaller doses of cortisone did not change the course of the infection significantly, although in this case the onset of 'non-lytic' antibodies was delayed and their titer lowered."

BARTH, R. Estudos anatômicos e histológicos sôbre a subfamília Triatominae (Hemiptera, Reduviidae). VI parte: Estudo comparativo sôbre a espermiocitogênese das espécies mais importantes. [**Anatomical and Histological Studies on the Sub-Family Triatominae. VI Comparative Study of Spermocytogenesis of the Important Species**] *Mem. Inst. Oswaldo Cruz.* 1956, Dec., v. 54, No. 3, 599–623, 59 figs. on 4 pls. German summary.

ROSSI BELGRANO, C., MARQUET, R. & SCLIAR, G. Miocarditis chagásica. [**Myocarditis of Chagas's Disease**] *Semana Méd.* 1957, Apr. 11, v. 110, No. 15, 483–7.

An account of 3 cases.

SCHENONE, H. & NIEDMANN, G. Nuevos aportes al estudio de la cardiopatía chagásica crónica en Chile. [**Further Contributions to the Study of Chronic Cardiopathy of Chagas's Disease in Chile**] *Bol. Chileno de Parasit.* 1957, Jan.–Mar., v. 12, No. 1, 2–7. [25 refs.]

The English summary appended to the paper is as follows:—

"1.—Clinical and electrocardiographic controls were made in a group of 240 human cases of Chronic *Trypanosoma cruzi* infection, as compared with another group of 129 non-infected, apparently healthy persons. Both groups were from the northern and central rural areas of the country and had been similarly studied in 1951–52.

"2.—Clinical manifestations, such as palpitation, precordial pain, dizziness, syncope and/or vertigo, discrete congestive heart failure, bradycardia, and hypotension were present in a higher proportion in the infected group, as compared with the 1951–52 survey. No such symptoms were present in the control group.

"3.—Insofar as electrocardiographic alterations are concerned, no significant quantitative differences were observed between both groups. However, electrocardiographic alterations were slightly more common and severe in the infected group.

"4.—The results obtained are in good agreement with the 1951–52 findings and are a further confirmation of the benignity of Chagas' disease in Chile."

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Gleiser, C. A., Thiel, J. & Cashell, I. G. **Visceral Leishmaniasis in a Dog imported into the United States.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 227–31, 3 figs. [11 refs.]

"A second case of visceral leishmaniasis in a dog imported into the United States from Greece is presented. Diagnosis was substantiated by demonstrating the presence of the organism in cultures of tissue removed from this animal and by histologic examination. The leptomonad forms were cultured from sternal bone marrow on NNN medium. The introduction of active visceral leishmaniasis into the United States in an animal host poses a problem which should properly concern public health and animal disease control officials."

[See this *Bulletin*, 1955, v. 52, 523.]

Acharyya, C. **Retinal Haemorrhage in Kala-Azar.** *J. Indian Med. Ass.* 1957, May 16, v. 28, No. 10, 437.

"A kala-azar case with retinal haemorrhage has been described, which improved with stibatin injections so far as the vision was concerned."

Varma, S. R. **Post-Kala-Azar Dermal Leishmaniasis.** *J. Indian Med. Ass.* 1957, May 16, v. 28, No. 10, 436–7.

"A case of exuberant warty growth in post-kala-azar dermal leishmaniasis confirmed by biopsy is reported."

Kirk, R. **Essay in Chemotherapy.** *Proc. Alumni Ass., Malaya.* 1957, Mar., v. 10, No. 1, 14–24. [Numerous refs.]

Having been one of the earliest workers to use aromatic diamidines in the treatment of kala azar patients, the author is well qualified to write this historical account of their synthesis and development. The discovery by Jancsó and Jancsó [this *Bulletin*, 1936, v. 33, 204] of the chemotherapeutic activity of certain guanidine derivatives against trypanosomes, although their mode of action was based on wrong assumptions, led Yorke *et al.* [*ibid.*, 1940, v. 37, 700] to study a great number of related derivatives. After the latter had shown that they possessed direct activity against a number of protozoan parasites, Ewins of May and Baker synthesized a series of symmetrical aromatic diamidines, the best known of which were stilbamidine, propamidine and pentamidine. The first-named was shown by Bowesman to become more

toxic in solution [*ibid.*, 1941, v. 38, 310]. This was proved to be the result of dimerization in ultra-violet light [*ibid.*, 1947, v. 44, 988; 1948, v. 45, 508] and the two possible isomers were isolated by chemical means.

The aromatic diamidines are also active against certain species of *Babesia* and *Plasmodium*, and cause relief of the bone pains in multiple myeloma. Some possess antibacterial activity of a high order as well as antifungal characters, and in some cases affect the growth of tumour cells. Their development was due almost entirely to the efforts of British workers. *J. D. Fulton*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Weyer, F. & Hornbostel, H. Erregernachweis bei einem Fall Brill-Zinsserscher Krankheit in Hamburg. [**Demonstration of the Causative Organism in a Case of Brill-Zinsser Disease in Hamburg**] *Schweiz. med. Woch.* 1957, June 8, v. 87, No. 23, 692–5, 2 figs. [26 refs.]

The English summary appended to the paper is as follows:—

"An additional case of Brill-Zinsser's disease has been reported. The patient, who acquired the infection 10 years ago, failed to exhibit any symptoms different from those of the previous relapses. The Weil-Felix reaction was positive. Diagnosis could be ascertained serologically by complement fixation and agglutination tests 8 days after the onset of the disease. The causative organism could be isolated by feeding lice on the patient and furthermore by inoculating blood from the patient into guinea pigs. The Rickettsial strain isolated by these procedures proved to be identical with Rickettsia prowazeki, as far as serological and biological properties are concerned."

Mohr, C. O. & Smith, W. W. **Eradication of Murine Typhus Fever in a Rural Area. Preliminary Report.** *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 2, 255–66, 1 fig. [20 refs.]

Partial but good control of commensal rats and their fleas in an area of 130 sq. miles of Grady County, Georgia, in the United States, was considered as probably adequate for the eradication of murine typhus. Half of about 700 rural premises were rat-infested (*R. norvegicus* and *R.*

rattus); nearly half of the rats sampled had antibodies to the rickettsia of murine typhus. Control measures were carried out from July 1953 until May 1954, rats being poisoned mainly with baits containing Warfarin, but sometimes Pival, red squill and zinc phosphide were used and also Cyanogas dust. Flea control was by dusting 10% DDT in rat runs and burrows and around the poisoned baits. Treated premises were re-treated if rats re-established themselves.

88% of 309 premises were made rat-free but the rats persisted in 40 premises where harbourage and food were particularly favourable. The observed kill was about 12 rats per farmstead but the actual kill was probably at least twice as many more. Decline of the flea population was observed in three rat surveys up to one year after the control programme was completed. Although *Leptopsylla segnis*, *Echidnophaga gallinacea*, besides mites, a tick, and a louse (*Polyplax*) occurred on rats at the end of the year, the frequency of *Xenopsylla cheopis* dropped from 8·1% of rats infested in a survey soon after the control work to nil at the end of the year. Probable levels of flea infestation of rats, if control had not been carried out, vary between about 30% and 70%.

The final survey also indicated that murine typhus had been eliminated in association with this effective control of *X. cheopis* and destruction of much of the original rat population. Although fresh rat invasion of cleared premises was taking place at the rate of 25% of the premises per year, the rats were not only free of *X. cheopis* but without evidence of murine typhus. It is suggested that these control measures should also be effective in controlling murine plague in commensal rats.

D. S. Bertram

Barme, M. Le traitement par la Spiramycine de l'infection expérimentale à *Rickettsia orientalis*. [**The Treatment of Experimental *Rickettsia orientalis* Infection with Spiramycin**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1085–9.

These experiments were performed with a strain of *R. orientalis* isolated in north Viet-Nam. Mice were inoculated intraperitoneally with an amount of brain + spleen suspension which produced an infection regularly fatal in 11 days in untreated controls. The daily administration for 20 days in 2 divided doses of 0·5 mgm. (= 25 μgm./gm. body weight) Spiramycin either subcutaneously or orally prevented the development of the infection. When treatment was delayed until 9 days after inoculation, a total daily dose of 1 mgm. overcame the infection. The oral route is said to have been more effective, dose for dose, than the subcutaneous: this is attributed to slower absorption, producing a more continuous effect.

[See also this *Bulletin*, 1955, v. 52, 624; 1956, v. 53, 102.]

L. P. Garrod

Watanabe, S. **Experimental and Clinical Studies on Unsaturated, Seven-Membered Ring Compounds. 22nd Report: Experimental and Clinical Studies of Hinokitiol-Natrium and Tropolone on** *Rickettsia tsutsugamushi*. *Acta Med. et Biologica.* Niigata. 1956, Dec., v. 4, No. 3, 189–215. [46 refs.]

Heisch, R. B. **Rickettsiae from Ticks and Rodents in Kenya.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, May, v. 51, No. 3, 287.

Tick typhus is endemic in Nairobi, Kenya, and the author provides evidence to indicate that it is a zoonosis. Rickettsiae were isolated from *Haemaphysalis leachi*, *Rhipicephalus simus* and *Amblyomma variegatum*, all of which occur on dogs, and the last-named on cattle. Rickettsiae were not recovered from *R. sanguineus* or *R. pulchellus*. Serum from dogs in Nairobi often agglutinates *Proteus OX19* and *OXK* to high titre. *H. leachi* and *R. simus* are also found in the burrows of the rodents, *Arvicanthis* and *Otomys*. Two strains of rickettsiae were isolated from *H. leachi* taken from burrows of *Otomys* but none from ticks collected from those of *Arvicanthis*.

Brain and spleen emulsions of the wild rodents were inoculated into guineapigs. One animal inoculated with *Otomys* brains developed a scrotal reaction, but no rickettsiae were isolated: another guineapig inoculated with *Otomys* spleens reacted and a few rickettsiae were found in smears from the tunica vaginalis. The strains from ticks and from the rodent showed cross-immunity in guineapigs. Rickettsiae were commonly difficult to find in smears from the tunica vaginalis: they were scattered in the cytoplasm of the cells and sometimes intranuclear. The scrotal reactions in guineapigs were only moderately severe. The findings indicate that the rickettsiae from ticks and rodents in Nairobi are the *R. conori* type: *R. mooseri* has not yet been found.

An African volunteer was inoculated with a strain from *R. simus*: he developed typical tick typhus, with a rapid rise in titre to *Proteus OX19* and rickettsiae were recovered from his blood. In another volunteer the rodent strain caused headache and pyrexia.

Detailed results are promised. *H. J. O'D. Burke-Gaffney*

Ludford, C. G. & Cook, I. **Serology of a Strain of** *Rickettsia australis* **isolated in South-East Queensland.** *Med. J. Australia.* 1957, Apr. 6, v. 1, No. 14, 463–5.

Cross complement-fixation (CF) and protection tests showed that the JC strain of rickettsiae isolated in 1955 from a patient with a clinical diagnosis of tick typhus [this *Bulletin*, 1955, v. 52, 1069] and identified provisionally as *Rickettsia australis* was in fact identical with a known

strain (PHS) of *R. australis*. Details are given of the method used for preparing rickettsial antigens for CF tests. In this method, which is that used by the Rocky Mountain Laboratory of the United States Public Health Service, eggs in which the embryos have died on the 4th day after inoculation are left at room temperature for 24 hours before yolk sacs are harvested; the period at room temperature is essential for a good yield of antigen. Further steps include emulsification of yolk sacs in formol saline followed by centrifugation and ether extraction of rickettsial suspensions. After centrifuging at 7,000 r.p.m. for 30 minutes, the organisms are resuspended in saline and shaken with glass beads. The final product contained large numbers of rickettsiae and practically no debris. *R. S. F. Hennessey*

Cauvin, L., Tasque, P. & Languillon, J. Endocardite infectieuse subaiguë primitive et rickettsioses. Guérison rapide par la rovamycine. [**Primary Subacute Infective Endocarditis and Rickettsial Infection cured rapidly by Rovamycine**] *Méd. Trop.* Marseilles. 1957, Jan.–Feb., v. 17, No. 1, 125–9, 2 figs.

[See also this *Bulletin*, 1957, v. 54, 670.]

BARTONELLOSIS

Van Der Walle, N. **Verruga Peruana.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 149–57, 5 figs. [15 refs.]

A general review.

Perez Alva, S. État actuel des études sur la " Verruga " péruvienne. [**Present Position of Studies on Verruga Peruviana**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 108–28, 1 fig. on pl. [94 refs.]

A full review of the literature.

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Khurana, B. S., Bhatia, M. L. & Sharma, M. I. D. **Note on the *Stegomyia* Survey of Air and Sea Ports of Bombay.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Mar., v. 5, No. 2, 89–99, 1 map & 1 folding chart. [11 refs.]

An *Aëdes* (*Stegomyia*) survey made in Bombay, India, was mainly concerned with 3 areas: (1) the airport and half a mile around it amounting to 7·21 square miles; (2) the seaport and half a mile inland covering 7·58 square miles, and (3) one of the islands where oil tankers are unloaded.

The indices obtained were for *Aëdes* (*Stegomyia*) *aegypti*, both larvae and adults, and for all other *Aëdes* (*Stegomyia*) larvae and adults in each of the 3 areas.

The figures show that in the airport area mosquito control measures are fairly efficient; in fact, since 1948 the *Aëdes* index, based on larval searches, has remained constantly below 1·0%.

On the other hand, the figures obtained in the seaport area (including ships and country craft) and for the island indicate that mosquito control measures in these places need improvement. It is suggested that all mosquito breeding places should be oiled weekly and the breeding places of *Aëdes* should be eliminated; that buildings should be sprayed regularly with a residual insecticide and that consideration should be given to the possibility of mosquito-proofing drinking water containers on the country craft.

Recommendations along these lines have been made to the authorities concerned. *H. S. Leeson*

Trapido, H. & Galindo, P. **Mosquitoes associated with Sylvan Yellow Fever near Almirante, Panama.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 114–44, 9 figs. [21 refs.]

Elton [this *Bulletin*, 1952, v. 49, 684, 943] has reviewed the development and distribution of yellow fever in Panama. The present study commenced in 1951, after the death from yellow fever of a member of a road survey team at Almirante, and has continued for 2 years. Collections of biting mosquitoes have been made once a week at each of 4 stations in tropical rain forest. At each station simultaneous collections were made at ground level and at a tree platform 36–54 feet above the ground. A total of 57 species was recorded and the results from this area are compared with previously published results of similar mosquito

collections from deciduous forest on the Pacific side of Panama [see *ibid.*, 1955, v. 52, 1075].

Three species of *Haemagogus*, *H. equinus*, *H. spegazzinii falco* and *H. lucifer*, were recorded, of which the first two were commoner species. Very few *Haemagogus* mosquitoes were found biting at night and of those captured during the day less than 3% were captured at ground level, the majority being taken biting in the tree canopy. This is in contrast to the behaviour recorded in deciduous forest, where the canopy is more open, where 20–33% of the total biting *Haemagogus* captured were taken on the ground. In view of the more extreme stratification of mosquitoes in eastern Panama the authors suggest that the most likely conditions under which sylvan yellow fever is transmitted at ground level are only when a tree is cut down or where the canopy is naturally broken.

Compared with the behaviour found in deciduous forest other species of mosquito, including *Aëdes leucocelaenus clarki* and *Sabethes chloropterus*, showed similar greater restriction to the tree canopy in the tropical rain forest. Of 12 arboreal mosquitoes, 9 were found 90% or more, and 3 were found 80–90%, in the tree canopy. Of 21 ground-level mosquitoes 17 were found 90% or more at ground level, and 3 from 80–90% at ground level. Only one species, *Aëdes leucotaeniatus*, was captured relatively frequently both in the tree canopy and also on the ground. This species is closely related to *A. leucocelaenus* which in contrast was almost totally arboreal.

In the rain forest canopy *Sabethes chloropterus* was found biting more regularly than the *Haemagogus* species and *Aëdes leucocelaenus*, and was also 3–4 times as abundant as these species. Consequently this species may be important in the maintenance of yellow fever in the monkeys living in the tree canopy. *B. R. Laurence*

Galindo, P. & Trapido, H. **Forest Mosquitoes associated with Sylvan Yellow Fever in Nicaragua.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 145–52. [11 refs.]

In 1952 and 1953 11 human deaths from yellow fever were reported in Nicaragua, and numerous deaths of monkeys, some of which were shown to be due to yellow fever, were also recorded. Previously sylvan yellow fever had not been recognized in Nicaragua [see this *Bulletin*, 1953, v. 50, 402]. Collections of mosquitoes were made at a number of forest stations west and east of Lake Nicaragua in 1953 near places where sylvan yellow fever had been reported. The authors used their standard technique of establishing a tree platform and a ground level station at each locality and collecting mosquitoes between 9.00 and 15.00 hours.

West of Lake Nicaragua the dry season is more severe and the deciduous forest is more open and the canopy lower. Only two species of *Haemagogus* were recorded, of which only one, *H. equinus*, was

common. Tropical rain forest is found east of Lake Nicaragua and here 3 species of *Haemagogus*, *H. iridicolor*, *H. equinus* and *H. spegazzinii falco*, were frequently captured, *H. iridicolor* being 3 times more abundant than *H. equinus*, and 6 times more abundant than *H. spegazzinii*. As all the species of *Haemagogus* tested so far in the laboratory have been shown to be capable of transmitting yellow fever the authors suggest that *H. equinus* and *H. iridicolor* were the vectors of yellow fever on the Pacific and Atlantic sides of Nicaragua respectively. The authors also point out that in the more open woodland on the Pacific side the mosquitoes are less strictly arboreal and bite relatively more frequently at ground level than do the mosquitoes found in the tropical rain forest where the stratification into arboreal and ground biting mosquitoes is more extreme.

The roles of *Sabethes chloropterus*, which was found in both deciduous and tropical rain forest, and of *Trichoprosopon magnus*, which was the commonest arboreal mosquito in the rain forest, in the transmission of yellow fever are not properly known and the authors comment that laboratory experiments with these species would be valuable.

B. R. Laurence

DENGUE AND ALLIED FEVERS

Mason, P. J. & Haddow, A. J. **An Epidemic of Virus Disease in Southern Province, Tanganyika Territory, in 1952–53. An Additional Note on Chikungunya Virus Isolations and Serum Antibodies.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, May, v. 51, No. 3, 238–40.

In further studies of sera which had been stored at −20°C. for 2–2½ years after collection from patients in the acute phase of a dengue-like disease [the epidemic from which Chikungunya virus was isolated: see this *Bulletin*, 1956, v. 53, 1334, 1335], intracerebral inoculation of 6-day-old mice with 35 sera led to the recovery of 10 transmissible agents which were shown by neutralization tests to be identical and indistinguishable from Chikungunya virus. Tests on 9 paired acute and convalescent sera showed increases in neutralizing antibody for Chikungunya virus, ranging from 0·6 to 2·2 log units, in the convalescent sera. Of 44 convalescent sera for which no corresponding acute sera were available, 32 neutralized 400 LD50 of Chikungunya virus. These results confirm the conclusion previously reached, that Chikungunya virus was responsible for the epidemic.

R. S. F. Hennessey

RABIES

Campillo Sáinz, C. & Málaga, A. Rabia humana transmitida por murciélagos. (Confirmación del primer caso en México.) [**Human Rabies transmitted by Bats. First Case in Mexico Confirmed in the Laboratory**] *Gac. Méd. de México.* 1957, Jan., v. 87, No. 1. 13–19. [15 refs.]

Poul, J. & Rampon, R. Variation de la virulence du virus rabique fixe pour le chien inoculé par la voie intracérébrale (2e note). [**Variation in the Virulence of Fixed Rabies Virus in Dogs inoculated by the Intracerebral Route**] *Arch. Inst. Pasteur d'Algérie.* 1957, Mar., v. 35, No. 1, 40–42, 1 fig.

In further tests [this *Bulletin*, 1953, v. 50, 1037; 1956, v. 53, 578] it was found that between 1952 and 1956, the virulence of the Tangier strain of fixed rabies virus for dogs inoculated intracerebrally remained constant.

Placidi, L. & Chevrier, L. Action de la souche rabique Flury sur le chien nouveau-né. [**Inoculation of the Rabies Flury Strain into Newborn Puppies**] *Ann. Inst. Pasteur.* 1957, June, v. 92, No. 6, 847–50.

The English summary appended to the paper is as follows:—

"Puppies inoculated intracerebrally with the Flury strain present the same symptoms as rabbits: extreme excitement, sometimes interrupted by periods of calm. In one case, all the symptoms definitively disappeared. Another puppy was fully resistant. These last two animals manifested a solid immunity: 31 months after the first inoculation, one of them was resistant to one dose of street virus which killed the control. The virus could not be demonstrated in the CNS of the immunized puppy four months after inoculation. Serial transfers of the Flury strain on puppies' CNS do not seem to modify the comportment of the strain in guinea-pigs."

Yoshino, K., Kuma, N., Kondo, A. & Kitaoka, M. **Infection of the One-Day Old Fertile Hen's Egg with Rabies Virus. I. Growth Curves and Serial Passages.** *Japanese J. Med. Sci. & Biol.* 1956, Dec., v. 9, No. 6, 259–71, 2 figs. [10 refs.]

"Upon inoculation of 1-day old hen's eggs with 2 different strains of rabies virus, egg-adapted Flury and non-egg-adapted CVS, the maximum

titer of each strain of virus was reached in 5 to 7 days and the developing embryos usually died within one week. The virus was concentrated mainly in the embryo and to a lesser extent in the yolk-sac membrane. Infection of 1-day and 7-day eggs yielded almost the same quantities of Flury virus, despite a marked difference in size of the harvested embryo. Therefore, the eggs inoculated at the age of 1 day yielded more virus per g of embryo. The increased yield per g was approximately 1,000 fold with CVS strain. Serial passage of each strain of virus in 1-day eggs resulted in increased infectivity of the virus for 1-day eggs. Namely, in the first place, introduction of a small amount of the passaged virus into 1-day eggs could kill most of the embryos within a few days. Secondly, when ID_{50} titration in 1-day eggs was done, the passaged viruses showed ID_{50} units averagely one log higher than mouse-infective units, while with viruses routinely passaged in 7-day eggs or in mice the ID_{50} units closely agreed with mouse-infective units.''

Yoshino, K., Kondo, A., Kuma, N. & Kitaoka, M. **Infection of the One-Day Old Fertile Hen's Egg with Rabies Virus. II. Application to Rapid Viral Titration and Neutralization Test.** *Japanese J. Med. Sci. & Biol.* 1956, Dec., v. 9, No. 6, 273–82, 1 fig.

''Rabies virus was introduced into the yolk-sac of 1-day eggs at a site 5 to 10 mm aside from the blastodermal center and incubation was made at 37°C with rotation. By this procedure non-specific deaths of inoculated eggs were satisfactorily reduced. With the 1-day egg-adapted lines of Flury and CVS strains of rabies virus, eggs either died within a few days or developed normally. Higher death rates occurred with progressively greater concentration of virus in the inoculum. Hence, it was possible to titrate virus in 5 to 7 days. The egg LD_{50} titer was approximately one log higher than the mouse-infective units. The 1-day egg LD_{50} and ID_{50} units, therefore, appeared to be in good agreement with each other. With 10 eggs per dilution, the standard deviation of the LD_{50} titration result was 0·2 to 0·3 log. The results of a box neutralization test are presented.''

Andral, L. Sur un traitement antirabique intensif à l'occasion d'une morsure à la tête. [**An Intensive Course of Antirabies Treatment following a Bite on the Head**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 29–31.

The following is a translation of the author's summary:—

A 10-year-old girl was badly bitten on the head by a dog subsequently confirmed to be rabid, and survived. The bites were well washed

immediately in soapy water. The girl was given an intensive and prolonged course of antirabies treatment (205 cc. for 83 days), consisting of Fermi type phenolized vaccine. Antirabies serum was not administered. Treatment proceeded without incident of any kind and 21 months later the child was in perfect health. *John Rathborn*

Mengano, G. & Inglese, F. Venti anni di vaccinazione antirabbica in provincia di Brindisi. [**20 Years of Antirabic Vaccination in Brindisi Province**] *Igiene e San. Pubblica.* Rome. 1957, Jan.–Feb., v. 13, Nos. 1/2, 72–8. English summary.

Workers from the Brindisi provincial laboratory for Hygiene and Prophylaxis give details in this paper of the results of 20 years antirabic treatment. The figures date from 1935–1955, but the numbers attending the dispensary are very much greater from 1947 onwards. This is ascribed to the poor knowledge of hygiene of the inhabitants and to the little-known existence of the dispensary up till then.

For the whole period 3,624 persons, principally children, attended. 98·4% had been bitten by dogs 50% of which were strays, 1·4% by cats, the remainder by donkeys, horses, human beings and mice or rats, in that order. The lesions were mostly superficial and the lower limbs, legs, calves, and ankles most often affected.

For treatment, local wound toilet was carried out and anti-tetanus serum + antirabic vaccine given in differing ways according to the category of the biting animal.

A. Animals known and placed under regular veterinary observation: patients were given 5 cc. Fermi or Puntoni vaccine subcutaneously for adults, less for children, on alternate days for the whole time the animal was under observation (15 days); if the animal showed signs of rabies the patients were treated as in C below.

B. Stray animals (slight or deep bites): persons bitten received 5 cc. vaccine per day for 20 injections.

C. Rabid animals (slight or deep bites): 10 cc. per day for adults (5 cc. for children) for the 1st week, then the usual dosage up to a total of 35–40 injections.

Only 1 fatal case occurred, in a boy of 11 years of age who was bitten by a dog which died of rabies 3 days later. The boy did not complete the treatment. He died 30 days after being bitten. In general, complications following the injections were slight and never necessitated its suspension.

[This is a disappointing paper. No details are given of the actual number of persons in the above 3 categories and especially of those who received deep (*i.e.*, penetrating the epidermis) bites, on bare skin, by proved rabid animals, so the value of the treatment cannot really be

estimated. There is no report of the use of combined serum + antirabic vaccine. See Baltazard and Bahmanyar; Habel and Koprowski, this *Bulletin*, 1956, v. 53, 434, 435.] *W. K. Dunscombe*

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Bent, D. F., Rosen, H., Levenson, S. M., Lindberg, R. B. & Ajl, S. J. **Elemental and Amino Acid Composition of Purified Plague Toxin.** *Proc. Soc. Exper. Biol. & Med.* 1957, May, v. 95, No. 1, 178–81, 1 fig.

"A detailed elemental and amino acid analysis was performed on highly purified *Pasteurella pestis* murine toxin. Eighteen amino acids and a number of elements were identified. The high proportions of acidic amino acids found are in accordance with the previously observed isoelectric point of the toxin of 4·7. On a dry weight basis, 98% of the toxin molecule was accounted for by the organic analysis including ammonia and ash content."

[See this *Bulletin*, 1956, v. 53, 311, 312.]

Baltazard, M. & Eftekhari, M. Techniques de récolte, de manipulation et d'élevage des puces de rongeurs. [**Techniques of Collection, Manipulation and Rearing of Fleas from Rodents**] *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 2, 436–40, 1 fig.

The authors' techniques, used over 20 years, for collecting fleas from rodents, manipulating them in rearing procedures and in experiments with infective organisms are described. In the field, or in the laboratory, the rodents are held in forceps over a dish of ice-chilled water and most of the fleas disperse from the animal to fall to the water when the operator blows his breath vigorously against the lie of the fur. Other important points include the chilling of fleas on ice-cooled glass slides to immobilize them during identification and the protection of operators by aspiration of infective or potentially infective fleas (and their excrement) through several layers of gauze. *D. S. Bertram*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Finkelstein, R. A. & Lankford, C. E. **A Bacteriotoxic Substance in Autoclaved Culture Media containing Glucose and Phosphate.** *Applied Microbiol.* Baltimore. 1957, Mar., v. 5, No. 2, 74–9, 3 figs. [15 refs.]

"A bacteriotoxic factor (or factors) is formed in a simple, chemically defined culture medium for *Vibrio cholerae* (*Vibrio comma*) when glucose and phosphate are present during heat sterilization. Depending upon its concentration and the size of the inoculum, the factor may be rapidly bactericidal, or merely bacteriostatic; if delayed initiation of growth occurs in its presence, there is only a minor influence upon the growth rate and total cell crop.

"The same or a similar factor is present in autoclaved neutral solutions of glucose and phosphate, from which it can be removed by absorption with norite, or partly extracted with ether. A nonvolatile residue of an ether extract, less than 1 μg of which inhibits growth of small inocula of *V. cholerae*, contains carbonyl compounds upon which its inhibitory activity appears to depend. The factor also inhibits certain other gram negative species. The inhibition produced by the factor is counteracted by reducing agents, by certain carbonyl reagents, and by small quantities (0·1 to 10 μg) of peptone and yeast extract."

Pollitzer, R. **Cholera Studies. 8. Clinical Pathology.** *Bull. World Health Organization.* Geneva. 1957, v. 16, No. 1, 123–99. [Numerous refs.]

An account is given of the clinical pathology of cholera including the losses in the evacuations, the physical and chemical changes of the blood, the effect on the circulation and on urinary secretion with a discussion of the aetiology of post-choleraic uraemia.

The profound changes in the biochemistry in cholera are due to loss of water and salt as the result of the massive evacuations in the stools and vomits.

Loss of fluids and salts. The total loss in the stools may amount to as much as 5 litres in 24 hours, and salt content in the rice-water stage is about 0·5 to 1·0%. The fluid part of the cholera stools resembles that of the plasma minus its protein and is a transudate, the intestinal mucosa acting as a semi-permeable membrane. There is a considerable loss of alkaline bases in stools which disturbs the osmotic balance and leads to acidosis. The vomits are usually less in volume than the stools. In contrast, they are acid and contain a lesser amount of salt. Saha and Das [this *Bulletin*, 1952, v. 49, 1115] give the following average

figures of composition arrived at by examination of a series of stools. " Specific gravity—1,010; sediment—9·8 per cent.; reaction—pH 7·86; total protein—0·26 gm. per cent.; sodium—286·2 mgm. per 100 ml.; potassium—74·6 mgm. per 100 ml.; chlorine ion—268 mgm. per cent.; inorganic phosphate as PO_4—3·6 mgm. per cent.; bicarbonate—68·2 ml. of CO_2 per cent."

Blood changes. Liebermeister (1896) stated his opinion that " the essential and constant alteration of the blood consists in a decrease of the water content as, what signifies the same, in an increase of the solids ", and he supported this by observations on the increase in specific gravity of the serum. Rogers [*ibid.*, 1921, v. 18, 408], studying the specific gravity of whole blood, found that " in the acute stages of the disease the specific gravity nearly always varies between 1,060 and 1,068, rarely reaching as high as 1,072 in natives of India, in whom the normal figure in health is about 1,054. I have seen it as high as 1,076, but only in extremely severe cases. The most common point is about 1.063 to 1,065, which means a loss of about half the fluid from the blood and is nearly always accompanied by general symptoms indicating the necessity for transfusion ". These observations have been amply confirmed by many workers. The loss of fluid may be more than 60% in fatal cases.

The whole blood specific gravity, the volume of packed cells as estimated by the haematocrit method, the haemoglobin percentage and the red-cell count give a fairly reasonable indication of the degree of concentration of the blood in any given case. The concentration results in an increased viscosity of the blood and this is considered to be a major factor in the disease by some workers.

Leucocytosis is a constant in cholera, the counts being over 20,000 per cmm. in some cases. The percentage of neutrophil leucocytes is increased to 80% or over compared with normal value of 68%, while the number of lymphocytes is diminished. There is a slight increase in the percentage of large mononuclears. The increase is more than can be accounted for by the concentration of the blood.

Chemical changes in the blood. Chlorides. Although the plasma-chloride percentages are within the normal limits or even slightly increased, taking into account the decrease in the volume of plasma and interstitial fluid, there is a large loss of chloride from the body while isotonicity may be maintained. *Sodium.* It has generally been found that the blood sodium is reduced and the loss of sodium may exceed the loss of chlorine. *Potassium.* An increased potassium content is usually shown, particularly in severe cases. It has been suggested that this is due to an outpouring of potassium from the cells as the result of an increased permeability of the cell membranes. *Calcium.* The calcium content of the blood appears to show changes parallel to those of the blood specific gravity. *Inorganic phosphates.* These are consistently increased.

Reaction of blood and acidosis. The loss of alkaline bases in the stools

results in a decreased alkalinity of the blood and acidosis, which is a constant feature of the disease and very marked in severely affected patients. The CO_2 combining power of the blood is much reduced. There is a marked tolerance to the administration of alkalis, very large quantities being required to render the urine alkaline: the acidosis necessitates transfusion with alkalis as well as saline in the later stages of the attack.

Protein content. The contention of Garrod (1849) that the protein content of the blood is increased in the acute stage of cholera has been supported by all workers on the subject. Malik and Pasricha [*ibid.*, 1941, v. 38, 582] gave the following average figures for a series of cases, in mgm./100 ml.:

	Average	*Normal limits*
Protein nitrogen	1,538	928–1,376
Fibrin ,, ...	94	32–64
Globulin ,, ...	812	192–464
Albumin ,, ...	652	544–1,072

There is obviously no appreciable loss of the plasma proteins from the body.

Blood sugar determinations. The reported levels of glucose in the blood are somewhat contradictory. Hyperglycaemia and hypoglycaemia have both been observed. The former might be due to blood concentration or the non-utilization of sugar for unknown reasons.

Blood urea. There is a definite increase in blood urea in all patients from the time of the onset of the attack. The urea increases progressively, but falls fairly rapidly in patients who recover. In the acute stage the level in one series of patients was found to vary from 28 mgm. to 125 mgm. per 100 ml. with an average of 62 mgm., as compared with a normal of 15 to 40 mgm. Much higher levels have been observed in many patients, especially in the anuric stage, and these are not incompatible with recovery.

Non-protein nitrogen. A rise in non-protein nitrogen occurs which is attributable to retention of waste products in the body and, in the acute stage, to anuria. The rise is progressive but the level is soon lowered on the re-establishment of the flow of urine.

Circulatory failure. The profound circulatory failure which is a feature of cholera is not of central origin but is of peripheral nature. The loss of body fluid is of course a factor, but the distribution of the blood plays a more important role in the circulatory changes which occur. The arteries and capillaries are empty and the veins are engorged, particularly in the splanchnic area. The effective circulating volume of the blood is very much reduced. There is a fall in blood pressure as the result of loss in circulatory fluid, the systolic pressure being often 70 mm. or lower on admission to hospital and there being no measurable diastolic pressure in severe cases. The venous pressure is also lowered in all cases in proportion to their severity. The circulation time is lengthened, owing partially to the increased viscosity of the blood. In

many cases the replenishment of the depleted fluids and salts produces a quick recovery of the circulation.

Renal failure. The loss of body fluid as a consequence of the evacuations produces a quick diminution of the flow of urine which often goes on to complete anuria. In many cases anuria persists for 2 to 3 days or even longer. This is not incompatible with recovery although if unduly prolonged the prognosis is unfavourable. If the stage of anuria is short a " critical diuresis " occurs on recovery. An important factor in the causation of anuria is considered to be that the lowered blood pressure is insufficient to maintain glomerular filtration. An explanation which De and Sengupta (*Lancet*, 1951, Dec. 15, 1100) have put forward for the cause of anuria is that there is a shunting of blood from the cortex to the medulla of the kidney which deprives the cortical glomeruli of most of their circulation; they have found evidence of this at post mortem.

The urine before the onset of anuria is scanty in quantity, of high specific gravity, rich in salts and urates and as a rule contains albumin. The first voided after a period of anuria is usually of a deep yellow colour, low in specific gravity, poor in urea and sodium chloride, often containing a considerable amount of albumin and has a sediment of hyaline and epithelial casts. As recovery takes place, with restoration of the circulation, the urine secretion rapidly increases till a quantity far exceeding the normal is reached. It contains large quantities of urea but the sodium chloride content does not rise until later.

Uraemia. There is no consensus on the aetiology of post-choleraic uraemia. The condition occurs mainly in patients admitted more than 48 hours after the onset of the disease and attacked with particular severity and in whom it is difficult to restore the urinary secretion. Earlier observers considered that it was due to a retention of urea and other nitrogenous substances normally excreted in the urine. It has also been attributed to acid intoxication. According to Shorten (*Indian J. Med. Res.*, 1918, v. 5, 570): " Post-choleraic uraemia is really a misnomer. The condition really is a retention acidosis, as shown by the diminished alkalinity, phosphatic retention, and peculiar type of dyspnoea. The concomitant retention of urea or other nitrogenous metabolites does not appear to be of any importance, except in so far as it denotes abeyance of the function of the kidneys."

Many workers have stressed the importance of pre-renal azotaemia in the causation of post-choleraic uraemia. While recognizing this, Chatterjee [this *Bulletin*, 1941, v. 38, 582] considered that the thickening of the basal membrane in the glomeruli of the kidneys, found by him, would impede filtration and might to a certain extent be responsible for the high level of nitrogenous products in the blood.

It is likely that " . . . the symptom complex of uraemia is due to an interaction of various causative factors rather than to any single cause ".

J. Taylor

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Nakamura, M. & Goldstein, L. **Occurrence of Glutaminase in *Endamoeba histolytica*.** [Correspondence.] *Nature.* 1957, June 1, v. 179, 1134.

Nakamura, M. **Effect of 4-Amino-5-Imidazolecarboxamide and Related Compounds on the Growth of *Entamoeba histolytica*.** *Canadian J. Microbiol.* Ottawa. 1957, Apr., v. 3, No. 3, 501–3. [11 refs.]

"4-amino-5-imidazolecarboxamide and 4-amino-5-imidazolecarboximidine were found to be stimulatory to *Entamoeba histolytica* when studied under bacteria-free conditions. These compounds in combination with folic acid or leucovorin, adenosine triphosphate, and ribose-5-phosphate greatly stimulated amoebic multiplication."

Reeves, R. E., Meleney, H. E. & Frye, W. W. **Bacteria-Free Cultures of *Entamoeba histolytica* with Chick Embryo Tissue Juice.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 213–18.

The authors describe a method devised by them for cultivation of bacteria-free cultures of *Entamoeba histolytica*. The medium consisted of (1) a base, representing modified Shaffer-Frye medium composed (in gm./litre) of trypticase 20, glucose 10, $K_2HPO_4.3H_2O$ 2, NaCl 2·5, yeast extract 2, thiomalic acid 1·5 (sodium hydroxide to *p*H 7·0, about 10 ml. of 2N NaOH solution); it was distributed in screw-cap tubes and autoclaved; (2) "chick embryo tissue juice", obtained from 10-day chick embryos, placed in a sterile syringe filled with a steel sieve, through which the embryos were squeezed out, after which the extruded tissue was mixed with an equal volume of the base (1), and the suspension was centrifuged and decanted, leaving the "juice" which was tested for sterility and stored in a refrigerator.

In one experiment an inoculum of 0·5 ml. containing 6,000 amoebae, grown in the base medium (1) with an anaerobic streptobacillus, was inoculated into tubes containing 12 ml. of base (1) and 2·5 ml. embryo juice (2), as well as 1 ml. of a solution of 0·5 ml. horse serum and 5,000 units of penicillin in saline. Penicillin, which was used in 6 subcultures in order to inhibit the growth of the concomitant bacteria, was omitted from the 7th subculture and eliminated in the 8th subculture by addition of penicillinase.

In these experiments amoebae were grown in axenic cultures through a total of 20 transfers, in which the absence of both aerobic and anaerobic bacteria was verified by repeated sterility tests. These cultures showed an increase in the number of amoebae from 1·25 to 10·2 (average 4·3) times the number inoculated. Similar results were obtained with 3 more strains of *E. histolytica*. It was also shown that the addition of portions of embryonic tissue to the medium did not enhance the multiplication of amoebae, but freezing and thawing, as well as heating the medium to 70°C. for 10 minutes, or centrifuging it, had an adverse effect on their growth.

It is concluded that the active portion of the chick embryo juice is thermolabile and particulate. *C. A. Hoare*

Wyss, J. Amibiasis cutánea. [**Cutaneous Amoebiasis**] *Rev. Kuba Med. Trop. y Parasit.* 1956, July–Dec., v. 12, Nos. 7/12, 67–9, 2 figs.

An account of 2 cases.

Brandon, M. L., Jones, H. L. & Warden, H. D. **Pulmonary Amebiasis. Combined Resection and Medical Therapy.** *U.S. Armed Forces Med. J.* 1957, June, v. 8, No. 6, 901–6, 2 figs.

Glorieux, M. L'action d'une nouvelle substance pour le traitement de l'amibiase. [**Action of a New Substance for the Treatment of Amoebiasis**] *Ann. Soc. Belge de Méd. Trop.* 1956, Dec. 31, v. 36, No. 6, 823–6.

The drug is 11.925 Ciba; its constitution is not stated. Patients with acute amoebic dysentery (22), others with chronic amoebic dysentery (4), and yet others with both intestinal and liver amoebic involvement (3) were treated with it. The dosage was 7·5 mgm. to 50 mgm./kgm. of body weight [presumably by mouth] daily, and it was continued until 24 hours after the stools were free from parasites in the acute dysenteric cases. In the chronic group a daily 30 mgm. treatment was necessary for 8 days; in the remaining group it was given apparently for 6 days—but the liver signs were not resolved by the treatment. The only side-effect was colouring of the urine.

[In the absence of very considerably more information and greater detail little comment can be made on the value—if any—of this compound.] *A. R. D. Adams*

Van Droogenbroeck, J. B. A. Essais cliniques avec un nouveau produit synthétique dans l'amibiase. [**Clinical Trials with a New Synthetic Product in Amoebiasis**] *Ann. Soc. Belge de Méd. Trop.* 1956, Dec. 31, v. 36, No. 6, 875–9.

The drug, 11.925 Ciba, is described as the semicarbazone of 5-6 quinone-4-7 Phenanthroline, but its graphic formula is not given. It is stated to be actively amoebicidal both *in vitro* and *in vivo*. The toxicity to rats is low.

24 patients with microscopically proven active intestinal amoebiasis were treated with the drug for 4 days. The first 6 patients were given 25 mgm./kgm. of body weight daily in divided doses, the second 50 mgm./kgm., the third 75 mgm./kgm., and the final 6 patients 100 mgm./kgm. of the drug, daily. Stools were examined daily during treatment and on alternate days thereafter over at least 20 days. In all cases parasites had vanished from the stools by the 8th day; in some they had gone by the 2nd day, and in all but a small minority by the 4th day. The optimum dosage is 50 mgm./kgm. daily for 4 days; with higher doses there was some vomiting, and in one case slight transitory albuminuria. In a patient with liver enlargement and tenderness these subsided as a consequence of the treatment.

The author considers 11.925 Ciba to be an effective non-toxic amoebicide which merits further study. *A. R. D. Adams*

Hoekenga, M. T. **Trial of Poly(methylene-4-Hydroxy-Benzenearsonic Acid) in Amebiasis.** *Southern Med. J.* 1957, Apr., v. 50, No. 4, 536–9.

The results obtained from 43 patients treated with this substance are considered favourable. It consists of a mixture of polymers formed from the reaction of formaldehyde and 4-hydroxybenzenearsonic acid. It showed no action on *Entamoeba histolytica* in the presence of bacteria in a 1 in 2,000 dilution, but with no multiplying bacteria the compound was active at 1 in 4,000. In rats infected with *E. histolytica* doses of 25 mgm. twice daily for 2 days, cleared all of 10. Before the present work this newly synthesized drug had been tried out on 6 resistant Japanese cases.

The customary dose for older children and adults was 500 mgm. 3 times daily for 7–10 days (total, 10·5 to 15·0 gm.). Post-treatment follow-up examinations began 7–10 days after completion of the course. Apparent cure was admitted when a minimum of 6 negative stool specimens was obtained during the 6–9 months following treatment and when the patients remained clinically asymptomatic. The specimens were examined by both wet mount and iodine-eosin techniques. Sigmoidoscopies were not performed, nor could culture methods be undertaken.

Symptoms were alleviated rapidly. There were no instances of nausea or vomiting or other evidence of drug toxicity. Of the 43 patients, 80% satisfied all criteria of an apparent cure.

This compound is effective in controlling acute dysentery and 44% of the patients treated were in this state. Follow-up was terminated between 6 and 9 months after treatment, but in 9 an adequate follow-up could not be carried out. *Philip Manson-Bahr*

Coutinho, J. O. & Rabelo, E. X. Nota sôbre o encontro de *Iodamoeba* Dobell, 1919 em fezes de porcos (*Sus scrofa domesticus*) em São Paulo. [**Occurrence of *Iodamoeba* in the Faeces of Pigs in São Paulo**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1956, June–Dec., v. 10, Nos. 1/2, 71–80, 3 graphs, 2 figs. & 1 pl. [16 refs.] English summary.

In order to ascertain whether pigs might act as reservoir hosts of human amoebiasis, the authors examined the stools of 145 animals from the township and state of São Paulo. However, there was not a single case of infection with *Entamoeba histolytica* among them, though other species of *Entamoeba*, *Endolimax* and *Iodamoeba* were present.

This paper is devoted to a study of *Iodamoeba* which was found in 92 (63%) of the pigs examined. With the view to determining the relationship of the porcine *Iodamoeba* to the human *I. bütschlii*, a comparative statistical study was carried out on their cysts in preparations stained with iron haematoxylin. While structurally the cysts of both strains proved to be indistinguishable, they differed in size as follows (200 measurements of each): porcine 7–22 μ, mean 13·3 μ, standard deviation 2·46 μ; human 6–16 μ, mean 11·9 μ, standard deviation 1·88 μ. Although the mensural difference between the two sets of cysts was statistically significant ($t = 6{\cdot}5$), the authors believe that it might be due to differences in their hostal environment, and accordingly propose to regard the porcine and human strains merely as races of *I. bütschlii*.

Since in Brazil infections with this amoeba are much more common in pigs (63%) than in man (9·8–17%), it is thought that the former might represent the reservoir of human infection.

The paper is illustrated by figures of the cysts of *Iodamoeba*, and by charts showing the frequency distribution of the sizes of the two races.

C. A. Hoare

YAWS AND OTHER TREPONEMATOSES

Labusquière, R. L'Extencilline dans le traitement du pian. [**The Penicillin Treatment of Yaws**] *Méd. Trop.* Marseilles. 1957, Jan.–Feb., v. 17, No. 1, 115–21.

The author gives an account of the successful use of dibenzyl-ethyelene-diamine-dipenicillin G (Extencilline, Bicillin) in the treatment of yaws and syphilis. The methods used and the results obtained are in conformity with general experience. [See this *Bulletin*, 1956, v. 53, 197; 1957, v. 54, 46.] *Frederick J. Wright*

Van Rootselaar, F. J. **Pinta in Indonesia.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, Mar., v. 9, No. 1, 33–44, 6 figs. & 1 map. [27 refs.]

The author had seen about 500 patients with what he regards as pinta in the Luwuk-Banggai district of the Celebes. He refers to previous publications about certain depigmentations in patients in Indonesia, the earliest of which was in 1855, and also to depigmentation in yaws in other parts of the world.

What he regards as pinta was depigmentation of the palms and dorsa of the hands and feet in adults over 30 years of age; he never saw it in children. All his pinta patients gave a history of yaws in childhood and all said that blue spots preceded the depigmentation. "25 to 50 per cent of the population show signs of" yaws in the area in which he was working "but syphilis is non-existent". The earliest lesions that he saw were itchy, slightly elevated, brownish-grey areas of skin with a fine, powder-like scaling. The areas of pigmentation, which he calls "pintids", extended with time and might involve the forearms, legs, face, neck and chest. Moderate hyperkeratosis of palms and soles was usually present. [It is sometimes difficult to separate what he had seen from what he had read as occurring in recognized pinta areas.] Contractures of the fingers were often present. "Patients who still had blue and reddish-brown pigmentations always had anomalies of the palms of the hands and soles of the feet, even if leucodermia started to develop." Some of the patients with depigmentation had juxta-articular nodules. About 1% of the population suffered from the disease, but the prevalence varied from village to village.

The response to PAM, 1·5 to 2 mega units, was most satisfactory and some of the depigmented areas later even returned to normal colour and appearance. This repigmentation started from pigmented spots that developed in the depigmented areas.

The author compares the "Indonesian pinta" with pinta occurring elsewhere and notes that hyperkeratoses are unusual in Mexican pinta

and that the pinta of the Americas is a disease of childhood. He discusses the differential diagnosis in a region with endemic yaws and thinks that the hyperkeratoses in his patients are clearly distinguishable from those in yaws [but this is not very convincing]. He recalls F. N. Guimarães's naming of "pintoid yaws" [this *Bulletin*, 1947, v. 44, 719] and suggests that this might be better called "framboesoid pinta". He thinks that these pigmentary changes are due to "a type of pinta modified by an earlier yaws infection".

[The author reports no attempt to demonstrate treponemes in the pigmentary lesions. Although he feels justified in assuming that the patients he saw were suffering from pinta, many others would rather agree with him when he calls attention to the need for careful investigations of the pigmentary lesions seen in populations in whom yaws is endemic. If treponemes were found in these lesions attempts should be made to infect rabbits or hamsters. Should these attempts be successful the treponemes would probably be *Treponema pallidum* or *Trep. pertenue*.] *C. J. Hackett*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Lira, O. de A., e Silva, J. R. & De Almeida, A. P. Considerações epidemiológicas sôbre o contato fortuito da disseminação da lepra. [**Epidemiological Considerations regarding Fortuitous Contacts in the Dissemination of Leprosy**] *Rev. Méd. Municip.* Rio de Janeiro. 1956, Jan.–Mar., v. 23, No. 1, 22–9, 2 graphs.

Figures are given showing the yearly incidence of leprosy during the period 1935 to 1954 in the Federal District of Rio de Janeiro. In 1935 119 cases were diagnosed, and in 1954 361. The maximum was 435 in 1951. In July 1955 the total number of leprosy patients registered was 3,002 in a population of 2,698,231, of whom 1,211 were in institutions, giving a total prevalence per 1,000 of the population of 1·12, of whom 0·45 were in institutions and 0·67 under treatment outside.

Taking the population in 10-year age-groups the highest mean coefficient of incidence was in the 60–69 group with 21·52 per 100,000. Dividing the population according to sex the mean coefficient of male patients per 100,000 was 14·71, and for females 9·96. The only age-group with more females than males being 0–9 years with 27 males to 28 females. It is considered that the higher incidence among males, and the fewer contact histories in the higher age-groups, indicate greater

exposure of males to infection and the importance of fortuitous contacts in the spread of infection. This is also confirmed by the gradual rise of resistance as indicated by positive Mitsuda reactions. *Ernest Muir*

Gehr, E. **Leprosy in Childhood.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 101–24, 72 figs. [12 refs.]

The type of leprosy in Surinam is compared with that in East Asia, Brazil and Trinidad. The most striking feature is the convergence clinically of the different forms of the disease. The purely hypopigmented nature of tuberculoid lesions and the absence of erythema in indeterminate lesions are also noted.

Out of 1,867 leprosy patients regularly examined, 601 are children between 0 and 15 years of age. Of these only 12% are lepromatous. An unaccountable feature is the prevalence among Creoles, which is 2·1 [presumably per 1,000, but this is not stated] as compared with 0·29 among Bush Negroes, 0·74 among East Indians and 0·27 among American Indians.

The number of children with newly diagnosed leprosy gradually increased year by year from 26 in 1950 to 167 in 1954. This may be due partly to an extension of the municipal boundaries and an increase in the number of children attending schools.

The author describes the clinical features of the various forms of leprosy, illustrating them with a series of 72 excellent photographs.

Ernest Muir

Collier, W. A. & Gehr, E. **A Quantitative Leprosy Complement Fixation Test.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 165–8, 3 graphs.

Using "Tuberculosis-antigen Essen", the authors examined 146 sera of leprous patients for complement fixation. For complement titration the complement, in decreasing doses, is first placed in a water bath (37°C.) for one hour together with the diluted antigen, the haemolytic system being added after the hour is passed. The difference between successive complement doses is 0·025 ml. "In the experiment proper decreasing dilutions of inactivated (56°C.) serum of 4/5, 2/5, 1/5, 1/10, down to 1/320 were used in quantities of 0·25 ml each; they were fixed with two units of the complement dose of 0·5 ml and the diluted antigen (1:5·5) in the water bath (37°C) for one hour." Serum dilutions of 4 in 5 to 1 in 10 served as controls, as did negative serum. The Wassermann, Kahn and Meinicke tests were used as further controls.

It was found that syphilis did not significantly influence the test; that there was a titre of 1 in 40 or more in 49% of patients with globi present, but only 5% in those not showing bacilli. It was also found that while

lepromin-negative (so presumably less resistant) patients had a titre of 1 in 40 or more in 36% of cases, this titre was shown in only 11% of lepromin-positive patients; thus " . . . an individual lacking in leprosy resistance would be a good producer of antibodies, and a person with strong leprosy resistance a poor one. Thus, natural resistance and specific immunity would be diametrically opposed, which is impossible to conceive. Though the lepromin test is most useful in practice, its theory needs further explanation ". *Ernest Muir*

PATERSON, D. E. **Bone Changes in Leprosy.** *Leprosy in India.* 1956, Oct., v. 28, No. 4, 128–35, 7 figs. [15 refs.]

The author recognizes 3 types of bone changes in leprosy: specific changes due to lepra reaction and leproma, non-specific changes in the hands and feet due to secondary infections and anaesthesia, and osteoporotic changes due mainly to disuse.

In the first type there are 4 subdivisions when lepra reaction is present. If the reaction is slight there may be *pseudocyst* formation only, which heals up under specific treatment. If the reaction is more severe there may be an almost explosive appearance in a phalanx. But the destructive process is mainly subarticular in the most vascular part of the bone, resulting in joint " cupping ". Or there may be subperiosteal bone erosion. In absence of reaction there may be honeycombing, or (in children) tubular formation of the shaft of the metacarpal or metatarsal. A differential diagnosis is given distinguishing these specific bone lesions from tuberculosis, sarcoidosis, gout, multiple enchondromata and other conditions.

In the second type of bone lesion the acute stage results in osteitis, or osteomyelitis. In chronic infection, as the patient does not feel pain, there is a good blood supply, the subperiosteal layers of bone are slowly eroded and any involucrum that forms is absorbed. In the healed or quiescent stage there are many permanent deformities. In the mechanism of bone erosion 3 stages are described: the acute reactive with increased blood supply when the osteoclasts are stimulated and the osteoblasts inhibited; the subacute or chronic stage when there is fairly good blood supply and the osteoclasts are still active but the osteoblasts can lay down compensatory new bone on the medullary side of the cortex; the healed stage where blood supply is diminished and no subperiosteal bone is laid down.

Osteoporosis occurs when movements are restricted or there is glove-stocking anaesthesia. The balance between the action of the osteoclasts and that of the osteoblasts is upset. In the advanced stage of the disease the outlines of the individual bones may disappear altogether. There is no evidence that osteoporosis is caused by specific action of *Myco. leprae*. It occurred in only 23% of the author's patients.

The article is usefully illustrated with drawings of radiographs, based on the author's radiological study of 116 patients in Vellore, India, during the last 4 years. *Ernest Muir*

Laviron, P., Lauret, L., Kerbastard, P. & Jardin, C. Traitement synergétique de la lèpre par des injections hebdomadaires de 600 mg. de D.D.S. en milieu chaulmoogrique. Activité particulièrement intéressante sur les formes pauvres en bacilles. [**Synergic Treatment of Leprosy with Weekly Injections of 600 mgm. of DDS suspended in Chaulmoogra. Particular Effect in the Forms with few Bacilli**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 97–107, 4 figs. on 4 pls., 2 graphs & 1 chart. [10 refs.]

While the sulphones are very effective in the lepromatous malignant forms of leprosy, the results are often more irregular in the benign forms which constitute 85% to 90% of cases under treatment in French West Africa. After various trials it was found that in tuberculoid cases better results were obtained by a combination of DDS and chaulmoogra, the former being given in tablets and the latter by injection, both twice a week. Later it was decided to suspend the DDS in chaulmoogra, 600 mgm. of DDS being suspended in a mixture of neutralized *Hydnocarpus wightiana* oil and esters with 4% guaiacol added, making 6 cc. in all. Beginning with 2 cc., the dose was increased each week by 1 cc. up to 6 cc. and this dose was continued every week for a year. The injections were well tolerated, causing neither induration nor abscess. If reactions occurred in lepromatous or borderline cases the treatment was suspended temporarily.

In the lepromatous form there was amelioration in about 94% of patients. In tuberculoid cases there was generally complete healing in 18 months to 2 years. In the undifferentiated type there was great improvement in 95% of patients. With the combined treatment only 1·6% of cases remained stationary or got worse, compared with 6·7% on DDS alone, and 6% on chaulmoogra alone.

This combined treatment is not suitable for acute cases, but is particularly suitable for chronic cases, especially for those which have ceased to improve under DDS. *Ernest Muir*

Mukerjee, N. & Sen, N. R. **Haematological Effect of adding Yeast and Iron to DDS in the Treatment of Lepromatous Cases.** *Leprosy in India.* 1956, Oct., v. 28, No. 4, 121–7.

3 groups of lepromatous patients with 12 in each group were treated respectively with: tablets containing 50 mgm. of DDS, tablets with

50 mgm. of DDS and 500 mgm. of yeast, and tablets with the former 2 ingredients and 1·5 grain of ferrous sulphate. After 2 to 3 months' treatment there was deterioration of the blood picture in patients in the 3 groups to the extent of 60%, 70% and 75%. After 4 to 12 months' treatment there was improvement in 60% of patients in the first group, and of 50% in the other two. At the end of the observation period the blood picture had improved, from initial findings, in 40% of patients in group 1, 20% in group 2, and 25% in group 3.

It is concluded that yeast and ferrous sulphate in the doses given cannot counter the tendency of DDS to produce anaemia, nor do they help in improving the subsequent blood picture very much.

Ernest Muir

Serié, C. & Schaller, K. F. L'électrophorèse et la lèpre. [**Electrophoresis and Leprosy**] *Bull. Soc. Path. Exot.* 1957, Jan.–Feb., v. 50, No. 1, 17–20, 1 fig. on pl.

The authors tested the changes occurring in the sera of leprous patients under treatment, by means of electrophoresis. 202 patients of whom the types were: 81 lepromatous, 53 tuberculoid and 68 indeterminate, were divided into 4 groups each of which contained members of all types. The first group had no treatment and acted as controls; the second were treated with BCG alone; the third received sulphones alone; the fourth were treated with both BCG and sulphones.

When the tracings before and after 9 months' treatment were compared, there was little or no improvement in the controls, an improvement in 61% of those treated with BCG, a similar improvement in 61% of those treated with sulphones, and a similar improvement in 73% of those treated with BCG and sulphones. In the last group the improvement was shown in 80% of lepromatous cases.

It is remarked that such changes are found in all chronic affections, but it is certain that the treatment in leprosy does modify the protein level of the blood, and that it is possible by this method to follow the course of the disease in a leprosy patient. *Ernest Muir*

Smaka, R. S. & Capp, A. B. Nova terapêutica e profilaxia da reação leprótica. [**New Therapy and Prophylaxis of Leprotic Reaction**] *Rev. Paulista Med.* S. Paulo. 1956, July, v. 49, No. 1, 32–43. English summary.

The authors deny that lepra reaction is ever useful, and consider that it always aggravates the condition. In acute cases of reaction they advocate chlorpromazine, known also as Thorazine or Amplictil, along with an antihistamine drug, Phenergan [promethazine]. 50 mgm. of

each of these drugs are dissolved in 500 ml. of 5% glucose or normal saline and injected intravenously at the rate of about 40 drops a minute, or slower if there is a rise in temperature or a fall in blood pressure.

The results were: disappearance of pain in 100% of cases within some 24 hours; reduction of temperature to about normal in 80% within 6 hours, erythema and nodules diminishing from the 3rd day and disappearing by the 12th day in 80% of cases. There were about 47% of relapses within 12 months, most of these being in the first 3 months, but they all responded to another dose of the previous treatment.

In subacute reaction while the specific antileprotic treatment is continued, Amplictil may be given in 25 mgm. tablets by mouth, beginning with 1 tablet and rising to 4 on the 4th day. The dosage gradually diminishes from the 7th day to 1 tablet on the 10th day which continues to the 30th day. This treatment gave excellent results in 50% of patients, good in 17·7% and medium in 17·7%. Daily doses of 25 mgm. appeared to prevent or diminish reaction in patients under anti-leprosy treatment.

Side effects of this treatment are low blood pressure, drowsiness and desquamation, but none of these are counted serious. *Ernest Muir*

Smaka, R. S. & Capp, A. B. Nova terapêutica da neuralgia leprótica. [**A New Therapy of Nerve Pains in Leprosy**] *Rev. Paulista Med.* S. Paulo. 1956, July, v. 49, No. 1, 44–53.

The authors, after mentioning various general medicines and local applications for neuritis in leprosy, give their results of its treatment with chlorpromazine (Thorazine or Amplictil). The drug was given intravenously in 80 lepromatous cases with neuritis accompanying erythema nodosum; intramuscularly in 40 lepromatous, 10 tuberculoid, and 10 indeterminate cases; and orally in 40 lepromatous, 7 tuberculoid, and 5 indeterminate.

The intravenous injections were reserved for acute cases where acute reaction accompanied the neuritis, and Amplictil (50 mgm.) was combined with Phenergan [promethazine] (50 mgm.) in 500 ml. of 5% glucose.

The intramuscular injections were given three times at intervals of 2 or 3 days, 25 mgm. of Amplictil being mixed with 50 mgm. of Phenergan and injected at night because of the soporific effect of the latter.

The oral method in the daily schedule described [above] has distinct advantages over the other 2 routes, administration being much easier and the results practically the same.

There was complete relief in 90% of those treated by the intravenous and intramuscular routes, and in 82·7% of those treated by the oral route. The specific treatment may be continued while Amplictil is being given orally. *Ernest Muir*

Ilarshe, M. I. [**Experiments in Hypnotherapy on Leprosy Patients**] *Sbornik Nauchnykh Rabot Po Leprologii i Dermatologii.* 1956, No. 8, 231–3. [In Russian.] Rostov-on-Don: Experimental and Clinical Leprosarium of the Ministry of Health of the U.S.S.R. French summary (3 lines).

Referring to the work of the great physiologist, Pavlov, and to an observation in 1916 of L. V. Sobolev, " I rarely send them to sleep. I make use of the depression and enhanced suggestibility which already exist in the [leprosy] patients ", the author goes on to recount his own experience of the treatment of leprous neuritis by hypnotic suggestion.

The patient was made to lie comfortably on a couch, gazing on a small percussion hammer and listening to a monotonous stream of verbal suggestion, till he sank into hypnotic sleep. He was asked to go on sleeping with his eyes open. The signs of hypnosis were: absence of pupillary reflexes to light, deep breathing and slowing of the pulse. During a session of 40 to 50 minutes he was given therapeutic suggestions, in a firm assured tone, of the cessation of pain, better sleep, and a cheerful state of mind. Depending on results, 5 to 12 sessions were given.

Out of 6 patients with acute or subacute neuritis, 3 lost their pain entirely and recovered the power of sleep. Out of 6 others with distal paraesthesia of the limbs which disturbed their sleep, all recovered, but in 2 it recurred after 14–17 days owing to an insufficient length of treatment. In 2 out of 3 other patients with more generalized symptoms there was a good result lasting over a month's observation. This method is also of use when patients are suffering from depression. *Ernest Muir*

HELMINTHIASIS

*In this section abstracts are arranged as far as possible in the following order:—*Trematodes *(schistosomes, other flukes);* Cestodes *(Diphyllobothrium, Taenia, Echinococcus, other cestodes);* Nematodes *(Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.).*

Schwetz, J. Demonstration sur une collection de mollusques, variés, africains, lacustres et fluviatiles, hôtes intermédiaires de schistosomes humains et animaux. Présentation de la collection. [**Demonstration of a Collection of Various African Snail Vectors of Schistosomiasis**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1178–94, 1 fig. [11 refs.]

This collection of snail vectors of schistosomes, from the eastern part of the Belgian Congo, was presented under classified headings as follows:—

A. Lacustrine *Planorbis*

1. Lake Tanganyika. Large flat shells (15 mm.). *P. tanganyicensis* E. A. Smith. *P. tanganikanus* Bourguignat. (*P. sudanicus* von Martens.)
   Albertville. *S. mansoni* and *S. rodhaini.*
2. Lake Kivu. Solid shells, mono- and bi-carinate. *P. kivuensis* Schwetz.
   Bay of Sake-Bobandana. *S. mansoni.*
3. Lake Albert. Very small bicarinate shells, thin and very fragile (3–5 mm.). *P. alberti* Schwetz. ? *P. stanleyi* Smith. ? *P. choanomphalus* von Martens.
   Fisheries of Kasenyi and Mahagi-Port. *S. mansoni.*

4a. Lake Edward. Empty shells from sandy or gravel shores. Living *Planorbis* on *Vallisneria spiralis.* Small carinate shells with a large opening (turned downwards). *Planorbis smithi* Preston. ? *S. mansoni.*

4b. Lake Edward. Swamp streams. *Planorbis* of medium size intermediate between the flat kind of Lake Tanganyika and the globular forms from rivers. ? *P. edwardi* Schwetz.
   Fisheries of Vitshumbi and Katwe. *S. mansoni.*

4c. Kazinga Channel. The same *Planorbis* as in Lake Edward.

4d. Lake George. The same *Planorbis* as in Lake Edward. (*S. mansoni.*)

5. Lake Bunyonyi. ? *P. edwardi* Schwetz. The same as those of Lake Edward and those of other small mountain lakes.
   Kabale and Muko. *S. mansoni.*

B. Marsh *Planorbis*

Usually large flat shells like those of *P. tanganikanus.*

6. Koli Marsh (district of Lango, Uganda). *P. tanganyicensis.*
7. Kaseke Marsh. Near the bank of Lake Albert, Kasenyi. Small flat young shells. *P. tanganyicensis.*

C. Various riverine *Planorbis* (globular shells)

Planorbis pfeifferi Krauss.

1. Affluents of Lake Tanganyika and River Kukuga.
2. Affluents of Lake Kivu.
3. Affluents of Lake Albert.
4. Affluents of rivers.

Physopsis, Bulinus and *Pyrgophysa*

A. *Physopsis*

Specimens from 7 different localities were exhibited. *P. africana* from 4, *P. nasuta* from 1 and *Physopsis* sp. (large specimens) from 2 localities.

B. *Bulinus*

Specimens from 4 different localities, some laboratory bred, were exhibited. *B. coulboisi* came from 3 and *B. mutandoensis* came from 1 of these localities.

C. *Pyrgophysa*

Specimens of *P. forskali* from Lake Edward, Lake Albert, Kongolo and Stanleyville were exhibited. *J. J. C. Buckley*

McClelland, W. F. J. **Studies on Snail Vectors of Schistosomiasis in Kenya.** *J. Trop. Med. & Hyg.* 1956, Oct., v. 59, No. 10, 229–42, 2 maps & 1 fig.

These studies were carried out mainly in the parts of Central Nyanza Province of Kenya lying to the north side of the Kavirondo Gulf and also in the Coast Province, which extends from Tanganyika to Italian Somaliland; in the latter region the Kilifi District received special attention. The author reviews the work of previous workers, published and unpublished, on schistosomiasis and its vectors in the two areas visited.

S. haematobium is prevalent in children (65 to 100%) in the low-lying strip between the Gulf shore and the road running westward from Kisumu. Its western extremity appears to be Asembo Bay, about 30 miles from Kisumu. *S. haematobium* is widespread in the Coast Province, especially near the coast in heavily populated and well-watered places; *S. mansoni* infections in the Coast Province are thought to be imported from other parts of Kenya such as Nyanza Province.

Snails of the genera *Biomphalaria* and *Bulinus* were collected in the areas studied and their specific identity is considered in considerable detail from both the conchological and malacological aspects.

Biomphalaria sudanica (von Martens, 1870) was found commonly in the Kavirondo Gulf but was not found elsewhere. It is closer to Mandahl-Barth's subspecies *B. s. tanganikana* than to his *B. s. sudanica*. A fairly common species of *Biomphalaria* found in streams, pools and dams in the Kisumu area, is identified tentatively as *B. adowensis*. The possible identity of this species with *B. ruppellii* and of both of them with *B. pfeifferi* is discussed. It was also collected at Nairobi, Mwanza and in the Coast Province where it is apparently confined to the Teita hills.

In the *Bulinus* group, *B. forskali* was found very widely distributed in Central Nyanza in a variety of habitats. It was also found, but less commonly, in the Coast Province. *Bulinus* (*Bulinus*) *trigonus* (v. Martens) was found 5 times in Nyanza on submerged vegetation in dams. It was never found in the Coast Province. *Bulinus* (*Bulinus*) *tropicus* (Krauss, 1848) was collected from a dam at Ngong and from a small river

in Nairobi " almost certainly the situation in which the form *B. t. alluaudi* (Dautzenberg, 1908) was collected ".

Bulinus (*Physopsis*) *africanus* (Krauss, 1848) was of common occurrence in Nyanza, usually in streams, semi-permanent pools and occasionally in dams and in the Gulf itself. It was much less common in the Coast Province. *Bulinus* (*Physopsis*) *nasutus* (von Martens, 1879) was found in only 2 places, both in Nyanza, one a semi-permanent pool and the other a series of relict pools in a wet weather watercourse.

Bulinus (*Physopsis*) *globosus* occurs in two forms, *B. g. ugandae* around the Kavirondo Gulf and *B. g. globosus* on the coast where it is numerous in dams, rivers and swamps.

Experimental work was undertaken in Nyanza Province but not in the Coast Province. Mice were exposed to cercariae from naturally infected snails. " Four species of snail were found to be infected, and the infections turned out to be due to *S. mansoni* in the case of two species of *Biomphalaria* [one of which was *B. sudanica*], and a bovine schistosome in the case of two species of *Bulinus*. In one instance, the intestinal wall of a mouse infected from *Bulinus africanus* was found to contain eggs of the bovine schistosome and also those of *S. haematobium*, but it does not seem likely that this snail is usually the intermediate host of *S. haematobium* in the area. No other infections with *S. haematobium* were found."

Exposure of laboratory-bred snails, *Biomphalaria* sp., to infection with miracidia was successful with *S. mansoni* but exposure of *Bulinus forskali*, *B. trigonus*, *B. nasutus* and *B. africanus* to *S. haematobium* miracidia gave negative results.

Ecological studies were limited by local circumstances but observations were made on re-colonization of habitats by snails after the end of dry spells, on the period elapsing before the beginning of egg-laying and on the frequency of egg-laying. Best results were obtained from *B. forskali* and comment is made on the appearance of this snail " in pools of rain water within three or four days of their formation although the spots in question must have been dry for months before ".

Under the heading " Future Developments " the author discusses the implications of agricultural developments in Kenya in relation to the spread of schistosomiasis. " One project which is likely to become of importance is the growing of rice in swamps in the Kano plains behind Kisumu. It seems certain that this will provide much more favourable conditions for the transmission of schistosomiasis than exist there now. . . . The construction of dams appears to be essential for the full utilisation of land in East Africa, but unless some means of preventing the spread of schistosomiasis is found, the benefits of agricultural development may well be nullified to a great extent. This may be a suitable field for the use of some of the newly developed molluscicides."

J. J. C. Buckley

Watson, J. M. **Effect of Human Pollution on Density of Populations of *Bulinus truncatus*.** *Bull. Endem. Dis.* Baghdad. 1957, Jan., v. 2, Nos. 1/2, 19–29, 1 fig. [11 refs.]

"An account is given of field observations concerning the relationship between human pollution and populations of *Bulinus truncatus*, the molluscan intermediate host of *Schistosoma haematobium*. A large drain near the city of Baghdad was systematically surveyed for snails by dip net during the season of maximal snail populations over a length of some two kilometres where it runs through the village of Tel Mohammed. It was found that populations of *B. truncatus* were highest within the village itself and that they diminished rapidly beyond its limits until only scattered individuals could be found. Human pollution of the waters of the drain occurred within the village area. Very close correlation was observed between snail numbers and opportunities for human pollution of the water. The kinds and effects of pollution in relation to water-snail populations is briefly discussed. It is suggested that the favourable effect of human pollution on these snails may be due to their use of human faeces as food, to the contribution that faeces make to a soft substratum rich in decaying organic matter, to the possible fertilizing effect of human urine and faeces on the unicellular green algae which form the essential diet of young snails, to the possibility that pollution may discourage snail enemies, or to the possibility that human urine or faeces contains some growth factor which stimulates the reproduction of the snails. The question is raised as to whether a biological mechanism exists whereby pollution with the excrement of a particular definitive host species normally favours the development of large populations of the appropriate snail intermediate host species in the case of all species of schistosome."

Pellegrino, A. & Giudicelli, P. Confrontations radio-cliniques dans 85 cas de bilharziose urinaire. [**Radiological and Clinical Manifestations in 85 Cases of Urinary Schistosomiasis**] *Méd. Trop.* Marseilles. 1957, Jan.–Feb., v. 17, No. 1, 7–27, 12 figs. on 4 pls. [Numerous refs.]

The authors have analysed the clinical findings in 85 cases, and they have done intravenous pyelograms in each. The patients were young African civil servants or soldiers at Dakar; they were subject to constant reinfection with *Schistosoma haematobium*, though the area was one of low endemicity. The findings are set out very fully and are analysed; these should be consulted in the original by those interested.

The authors confirm the value, for diagnosis, of the classical signs of urinary schistosomiasis; of these haematuria is one of the most important. Albuminuria also is of value, and a straight X-ray of the bladder showed calcification in about a third of their patients. Cystoscopy

revealed bladder lesions with precision. In none of these Africans were there hypertension or changes in the ocular fundus or in the shadows of the heart or great vessels. Splenomegaly was rarely found and, where present, it was slight. These patients had been selected for their employment only after medical examination, therefore the authors' conclusions may not apply generally, for example in children, in other areas where the infection is hyperendemic and not light in incidence.

Intravenous pyelography revealed stasis or urinary suppression particularly due to involvement of the lower portions of the ureters. The ureteral lesions and consequent secretory complications develop slowly; schistosomal kidney involvement is considered to be an ascending type of nephritis. Intravenous pyelography is an indispensable and irreplaceable part of the investigation in all cases of urinary schistosomiasis.

A. R. D. Adams

Halawani, A., Abdallah, A. & Saif, M. **Evaluation of the Efficiency of Miracil-D in the Treatment of Bilharziasis in Egypt.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 134–40. [12 refs.]

All the patients, irrespective of weight or age, were treated with 12 gm. of Miracil D hydrochloride over 20 days in the form of a sugar-coated 200 mgm. tablet given orally thrice daily. In the tablet was incorporated 5 mgm. extractum belladonnae siccum (BP) to diminish its toxic side effects. 530 out-patients with *Schistosoma haematobium* infections causing urinary symptoms, some of them unsuitable for antimony treatment because of heart, kidney or other complications, were so treated. 114 in-patients with *S. mansoni* infections, and 34 with *S. haematobium* infections causing intestinal symptoms, also were treated in the same manner. Of the 530 urinary cases 267 (50·4%) were apparently cured of their infections, as judged by various urine examinations done immediately on completion of the treatment. The numbers of those attending for post-treatment observation steadily fell, but this figure (50·4%) rose to 75·9% among the 162 patients still under observation 6 weeks later. A lower initial cure rate was obtained among those in the lower weight groups than in those in the higher weight groups. This is attributable to the fact that the former included the children and is ascribed to their more rapid excretion of the drug—as is the case in antimony treatment. In a follow-up of 96 patients for at least 2 months 18 (18·7%) were found again to excrete eggs in the urine; this may have been due to re-infections.

The results of treatment of the intestinal types of infection (34 *S. haematobium* and 114 *S. mansoni*) with the drug were not nearly as satisfactory as in the urinary infections. The *S. haematobium* infections with intestinal lesions appeared to respond rather better than did the

S. mansoni, but for the latter, cure rates of only 24 to 37% could be claimed 3 months after the treatment. Poor absorption of the drug owing to intestinal hurry may be contributory to these unsatisfactory results. The side effects of the treatment in all cases were mild and did not demand interruption of the course of treatment for more than 1 day in any case. *A. R. D. Adams*

Pifano C., F. & Ron Pedrique, M. La cercaria-reacción de Vogel y Minning en el diagnóstico de la Schistosomiasis mansoni. [**The Cercaria Reaction of Vogel and Minning in the Diagnosis of Schistosomiasis mansoni**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 203–7. German summary.

The authors describe the results which they have obtained in Venezuela with the cercarial-sheathing (*Sercarienhüllen*) reaction of Vogel and Minning [this *Bulletin*, 1949, v. 46, 1154] in human *Schistosoma mansoni* infection. 5 patients who had bathed in infected water were studied during the invasion period by repeated application of the cercarial-sheathing reaction, the intradermal test and the examination of the faeces with concentration methods.

Brief histories are as follows:—

A. 7 years old—pruritus since the bathe. After 3 days a remittent fever began, lasting 2 weeks, accompanied by anorexia, asthenia and urticaria. Later there was diarrhoea which terminated in dysentery 6 weeks after the bathe. At 17 days, all tests negative; at 32 days cercarial reaction (CR) +; at 45 days CR ++, intradermal test (ID) ++, ova +.

B. 12 years—pruritus since the bathe. On the next day, fever and urticaria of 3 days' duration. Diarrhoea 6 weeks after the bathe. At 17 days, all tests negative; at 32 days, CR ++, ID +; at 45 days, CR +++, ID ++, ova absent; at 53 days, CR +++, ID ++, ova +.

C. 12 years—pruritus since the bathe. On the next day, urticaria of 3 days' duration without fever. At 32 days all tests negative; at 45 days, CR +++; at 53 days, CR +++, ID ++, ova +.

D. 16 years—no symptoms. At 32 days, all tests negative; at 45 days, CR +; at 53 days, CR +++, ID ++, no ova; at 62 days, CR +++, ID ++, ova +.

E. 37 years—no symptoms. At 17 days, tests negative; at 41 days, CR ++, ID +; ova present at 78 days but not at 57 days.

(If not mentioned above, tests were negative.)

Thus the cercarial-sheathing reaction began to be positive from the fourth week after exposure to infection, which was earlier than the intradermal reaction or the appearance of ova in the faeces.

In 1,380 proved patients with chronic infection, the cercarial-sheathing

reaction was positive in 78% of the cases. On the basis of these results it is recommended that this reaction should be included among the routine methods for the diagnosis of mansonian schistosomiasis.

F. Hawking

Warner, B. W. **Diagnosis of Schistosomiasis by Sigmoidoscopy and Rectal Mucosal Biopsy.** *J. Amer. Med. Ass.* 1957, Apr. 13, v. 163, No. 15, 1322–5, 1 fig. [17 refs.]

Many Puerto Ricans immigrate to the United States. *Schistosoma mansoni* infection is present in 10 to 40% of the population in the island [this *Bulletin*, 1946, v. 43, 1155; 1950, v. 47, 759]. Therefore *S. mansoni* infection must be considered as a possible cause of gastro-intestinal disease and liver disease with portal hypertension, ascites, spleen enlargement and oesophageal varices in both children and young adults of Puerto Rican origin. In such cases proctoscopy and sigmoidoscopy, with the removal of tissue by these means for biopsy, afford the means for rapid and accurate diagnosis by recovery and identification of the eggs. The technical procedures are outlined. *A. R. D. Adams*

Arafa, M. A., Bibawi, E. & Raafat, A. **The Portal Pressure in Hepatic Fibrosis associated with Bilharziasis.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 108–13, 3 figs.

74 patients with hepatic fibrosis in association with a *Schistosoma mansoni* infection were subjected to needle biopsy for confirmation of the liver pathology; 28 of the patients had ascites. The intrasplenic pressure was measured by the percutaneous method (Atkinson & Sherlock, *Lancet*, 1954, June 26, 1325) in each case, and direct readings of intrasplenic and portal pressures were made during operation in 8; percutaneous transhepatic portal pressures were read in 5 patients. Percutaneous spleno-portal venography was done in 27 cases. Comparable studies were made on 5 normal control patients, and on 5 with splenomegaly of other causation.

The intrasplenic pressures in the control patients varied from 50 to 160 mm. of saline; those of the patients with splenomegaly not associated with hepatic fibrosis or cirrhosis were similar. In the 74 patients with hepatic fibrosis the intrasplenic pressures were normal in 20 (27·2%), slightly raised (160–200 mm. of saline) in 7 (9·4%), moderately raised (200–250 mm.) in 9 (12·1%), and high (over 250 mm.) in 38 (51·3%). The intrasplenic pressure was raised in 60% of those without, and in 93% of those with ascites. The readings by the percutaneous method and those obtained during operation closely agreed; there was a direct

relationship between them and the portal pressure readings taken at operation, the latter being 8 to 48 mm. of saline lower than the former. There was a similar relationship between the intrasplenic pressures and the portal pressures determined by the percutaneous transhepatic method. In 38 patients with high intrasplenic pressures (over 250 mm.) haematemosis occurred in 9 (12·2%), oesophageal varices in 16 (21·6%), and an abdominal venous hum in 3. The sizes of the liver and the spleen bore no constant relationship to the intrasplenic pressure; but small livers and very large spleens were usual with a moderate or high pressure, and the same can be said of ascites.

Percutaneous spleno-portography in 27 cases showed that with normal livers and intrasplenic pressures the intrahepatic divisions of the portal vein could be seen to the 4th or 5th divisions; in portal hypertension the splenic and portal veins were dilated and tortuous, and the latter could be seen to the 2nd or 3rd divisions when the pressures were slightly raised; the divisions could not be seen when the pressures were high. Splenic vein thrombosis occurred in 4 patients with pressures of over 300 mm. of saline.

Splenic puncture is relatively safe, and spleno-portal venography can be done through the needle introduced for measuring the pressure. Contraindications to needling the spleen are prolonged bleeding, coagulation and prothrombin times; splenic infection; recent splenic infarction; splenic tenderness; and a skin infection over the site of puncture.

A. R. D. Adams

Bueding, E. & Mansour, Joan M. **The Relationship between Inhibition of Phosphofructokinase Activity and the Mode of Action of Trivalent Organic Antimonials on** *Schistosoma mansoni*. *Brit. J. Pharmacol. & Chemotherapy.* 1957, June, v. 12, No. 2, 159–65, 3 figs. [16 refs.]

Buttner, Alice. Quelques données pratiques et observations sur le cycle évolutif expérimental de *Schistosoma mansoni* (trématode, plathelminthe). [**Practical Considerations Relating to the Development Cycle of** *Schistosoma mansoni* **in the Laboratory**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1197–1211. [27 refs.]

In this article much information on the maintenance of *S. mansoni* in the laboratory is brought together from various sources and includes observations on the author's own experiences in this kind of work. Workers in this field will be already familiar with the techniques described, but those about to embark on it would be well advised to read this valuable article.

J. J. C. Buckley

Deschiens, R., Lamy, Huguette & Molinari, V. Intérêt pratique de la présence intra-hépatique des oeufs de *Schistosoma mansoni* embryonnés dans la bilharziose expérimentale du hamster. [**Practical Method of Obtaining Miracidia of** *Schistosoma mansoni* **from the Livers of Experimentally Infected Hamsters**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1109–10.

The authors describe a method of obtaining miracidia of *S. mansoni* for experimental purposes from the liver or gut of infected hamsters and mice. It consists essentially of teasing up the liver or chopping up the intestine into small pieces and placing the material in a flask with fresh water at 25°C. and exposing it to a bright light. The eggs contained in the material hatch out quickly and miracidia are collected.

J. J. C. Buckley

Lurie, H. I. & De Meillon, B. **Experimental Bilharziasis in Laboratory Animals. V. Immunity in Mice produced by Repeated Small Infections.** *South African Med. J.* 1957, Jan. 26, v. 31, No. 4, 68–9.

"1. The effect of repeated infections of mice with *S. mansoni* has been studied with special reference to the percentage of cercariae which mature to adult worms and the pathological changes produced.

"2. After repeated weekly infections 1·5% of cercariae mature to adult worms as compared with 23·5% after a single infection.

"3. With repeated weekly infections the pathological changes occurring after 20–24 weeks correspond to those found only 8 weeks after a single infection. After 24 weeks there is no significant difference between the two groups.

"4. There is a tendency to spontaneous cure 40–48 weeks after a single infection.

"5. It would appear that repeated infections produce a certain degree of immunity."

Michelson, E. H. & Augustine, D. L. **Studies on the Biological Control of Schistosome-Bearing Snails. V. The Control of** *Biomphalaria pfeifferi* **Populations by the Snail,** *Marisa cornuarietis*, **under Laboratory Conditions.** [Research Notes.] *J. Parasitology.* 1957, Apr., v. 43, No. 2, 135.

Chernin *et al.* [this *Bulletin*, 1956, v. 53, 1445, 1446] obtained favourable results in laboratory experiments on the biological control of *Australorbis glabratus* by the snail *Marisa cornuarietis* and Oliver-González *et al.* observed some similar control under field conditions [*ibid.*, 1444]. The authors therefore studied the possible effect of *Marisa*

in control of the African snail vector of schistosomiasis, *Biomphalaria pfeifferi*, in similar experiments. The *Biomphalaria* were obtained from laboratory colonies and it was found that the behaviour of this snail in an aquarium was very similar to that of *A. glabratus*.

M. cornuarietis was found to be effective in limiting the growth of *B. pfeifferi* under laboratory conditions. In control aquaria, *Biomphalaria* increased 26·7 fold, while in aquaria containing *Marisa* they showed little or no increase (the factors for increase in 3 experimental aquaria were 1·1, 0·0 and 1·4).

Adult *Marisa* do not destroy their own egg masses or young, but they devoured egg masses and young of *Biomphalaria* while browsing. The authors do not claim that their laboratory observations alone make it possible to predict similar results with *B. pfeifferi* under natural conditions, such as were obtained by Oliver-González *et al.* with *A. glabratus* in the field. *H. J. O'D. Burke-Gaffney*

Vermeil, C. L'orientation des recherches sur les actions molluscocides dans le cadre de la lutte contre les bilharzioses. [**Trend of Investigations on Molluscicidal Action in the Control of Schistosomiasis**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1254–64. [53 refs.]

The orientation of research during the past 3 years on snail control by means of chemical intoxication and by biological interference is reviewed in this article. Improvements in the methods of administering chemicals of known molluscicidal value (copper sulphate, sodium pentachlorophenate and dinitrophenols) are discussed and various other chemical compounds which have been tested but are as yet untried are mentioned.

Under the heading of molluscicidal action by biological agents, the subject is divided into 3 categories, vegetable agents, animal agents and the disturbance of the biological equilibrium. The author's conclusions are freely translated from the French as follows:

Research on molluscicides is directed (a) towards perfecting the application of the usual compound (*e.g.*, constancy of distribution level, longer duration of effect, and maintenance of stability); (b) towards the application of new compounds, either less expensive or more active. If these are insoluble in water they may be dispersed by the use of wetting agents so that they take effect on the snails by ingestion or by contact. It is possible that certain very effective compounds, which are at present excluded from practical use as they fall short of certain requirements, may, in the light of further knowledge of the biology of snails prove to be applicable under optimum conditions; (c) towards the introduction of new methods of biological control (specific infectious bacteria or bacteria which alter the snail habitat), and towards the study of new predators and parasites of snails; (d) towards the discovery of substitute fauna which would upset the biological balance. *J. J. C. Buckley*

Deschiens, R. Les actions molluscocides dans le cadre de la prophylaxie des bilharzioses. [**Molluscicidal Action in the Framework of Control of Schistosomiasis**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1264–84. [35 refs.]

This article is essentially on the same lines as the previous one by Vermeil but is 10 pages longer and goes into greater detail.

Deschiens, R. & Molinari, V. Sur l'action molluscocide de l'oxyde de zinc et de l'aldéhyde méthylique. [**Molluscicidal Action of Zinc Oxide and Methylic Aldehyde**] *Bull. Soc. Path. Exot.* 1956, Nov.–Dec., v. 49, No. 6, 1111–13.

Two water-insoluble salts, zinc oxide (ZnO) and methylic aldehyde or metaldehyde $(CH_3CHO)_3$ were tested against *Australorbis glabratus* and *Bulinus contortus* for molluscicidal effect.

Zinc oxide was added to aquaria of 75–100 litres' capacity, covering 3 areas each of 100 cm.², and each representing 30 gm. of the salt. 40 snails (30 *A. glabratus* and 10 *B. contortus*) were used in the test. Snails which came in contact with the chemical died on or near it in 5 to 24 hours, and in less than 15 days all the snails were dead. In control aquaria the snails remained normal.

Metaldehyde acted more quickly on the snails which became motionless and died in 6 to 36 hours after contact with it and all of them were killed in less than 9 days.

The authors conclude that these two salts rank high as molluscicides among the water-insoluble salts. They remark that the value of such salts lies in their long-lasting residual effect, and their economy, since they are used up very slowly. Moreover they do not make water unfit for drinking. *J. J. C. Buckley*

Paulini, E. & Pellegrino, J. **Influence of Infection with** *Schistosoma mansoni* **on the susceptibility of** *Australorbis glabratus* **to Copper Sulphate.** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, May, v. 51, No. 3, 283–4.

The authors, in Brazil, having found that snails infected with *Schistosoma mansoni* were more susceptible to sodium pentachlorophenate than were non-infected snails, carried out susceptibility tests of *Australorbis glabratus* to copper sulphate in running water.

The molluscicide, at 15 to 20 p.p.m., was applied for ½, 1, 2 and 4 hours and all but the last test were repeated. Mortality counts were made daily for 3 days and all snails were examined for *S. mansoni* cercariae after each run. In each group 20 to 40 snails were used. A table shows that in the 4 respective periods the mortality varied from 42·5% to 100% in infected snails and from 25% to 75% in the uninfected. In all tests the mortality rate was higher in the infected group,

the proportion between the mortalities being for 2, 1 and ½ hours, respectively, 1·66, 2·27 and 1·7 (mean 1·87).

It is therefore assumed that in these tests infected snails were 1·87 times more susceptible to the lethal action of copper sulphate than were uninfected snails. This agrees closely with the authors' figure of 1·85 with sodium pentachlorophenate. It is suggested that molluscicides may eliminate or greatly reduce the number of infected snails even when a complete kill is not achieved. *H. J. O'D. Burke-Gaffney*

Schwetz, J. Nouvelles recherches sur *Schistosoma intercalatum* Fisher. [**New Studies on** *Schistosoma intercalatum*] *Ann. Soc. Belge de Méd. Trop.* 1956, Dec. 31, v. 36, No. 6, 845–57, 1 folding map.

Part of the author's summary in French is freely translated as follows:—

While engaged on antischistosomal work in the Congo in 1955 we spent a month examining Africans on the left bank of the Congo River at Stanleyville, and collecting *Physopsis* for detection of cercarial infection. All the small streams of the left bank are infected and especially the Kitufu (at Lula) and the Kalema (tributary of the Lubuga in the African town).

Of 251 men, women and children examined from the Lula plantation, 38·6% were infected (with *S. intercalatum*). Children, especially boys, were heavily infected (63%). Generally, infections were light but we found a number of quite serious " clinical cases ".

While in Stanleyville we infected a goat and a ewe with drinking water containing cercariae from *Physopsis* from the Kitufu and Kalema streams, a result which indicates the close affinity, if not identity, of *S. intercalatum* with *S. mattheei*. *J. J. C. Buckley*

Cheng, Nai-Kuang & Ch'ien, Pen-Chung. **Pyloric Obstruction and Sigmoidal Fistula due to Schistosomiasis. Report of Two Cases.** *Chinese Med. J.* Peking. 1957, Apr., v. 75, No. 4, 324–7.

Though many pathological conditions involving a variety of organs have been reported to be resultant on schistosomal infections, the authors are not aware of hitherto-recorded pyloric obstruction or sigmoidal fistula among them.

Their first patient, a male aged 52 years, had suffered increasing abdominal pain for 4 years and attacks of vomiting for one year. On admission to hospital the abdomen was slightly tender and distended. A barium meal showed pyloric obstruction, the stomach being dilated and extending down to the symphysis pubis. At operation an indurated mass the size of a walnut was found at the upper border of the pyloric region; there were many sand-like yellowish-white patches on the surface of the

liver, small intestine and omentum. Carcinoma with widespread metastasis was suspected, and an antecolic gastroenterostomy was done. Section of the tissue showed the lesions to be schistosomal granulomata with contained eggs [apparently *Schistosoma japonicum*]. Tartar emetic treatment restored the patient to good health and 2 years later he was engaging in heavy manual work.

The second patient, a female aged 20 years, when seen had had a faecal fistula located at the upper border of the left iliac crest for 9 months. She had suffered from chills and fever for some months 5 or 6 years earlier, and at that time also had passed dysenteric stools for 10 days. She was under-developed, anaemic and undernourished, and she had amenorrhoea. On admission the spleen was palpable $2\frac{1}{2}$ fingers below the costal margin; the spine was scoliotic; and there was an irregular fistulous faecal opening located at the upper border of the left iliac crest; this was 5 cm. deep, and was filled with granulation tissue. Sigmoidoscopic biopsy did not yield schistosome eggs; there were no amoebae or schistosome eggs in the stools. A barium enema showed the fistula to arise at the junction of the descending and sigmoid colons. The condition was considered tuberculous and treated accordingly; later a resection of the diseased colon was undertaken and an end-to-end anastomosis was done. Sections showed numerous schistosome eggs in the mucosa and submucosa of the removed bowel, and also in the lymph nodes. Tartar emetic treatment in this case, also, produced a rapid and satisfactory end result. *A. R. D. Adams*

Dao, Chin, Ch'i, Wei-Liang & Ts'ai, Yi-Hsin. **Ventricular Flutter and Fibrillation producing Adams-Stokes Syndrome following Tartar Emetic Therapy in Acute Schistosomiasis japonica.** *Chinese Med. J.* Peking. 1957, May, v. 75, No. 5, 390–93, 3 figs. on pl.

"A case of ventricular flutter and fibrillation giving rise to fatal Adams-Stokes syndrome during tartar emetic therapy in acute schistosomiasis japonica is presented."

Basnuevo, J. G. Un nuevo tratamiento de la Clonorchiasis. [**A New Treatment for Clonorchiasis**] *Archivos Hospital Universitario.* 1956, Nov.–Dec., v. 8, No. 6, 337–44.

The English summary appended to the paper is as follows:—

"The author reports 10 cases of Clonorchiasis, treated with Chloroquine Diphosphate (Tanakan) at the dose of 0·50 Gm. per day during 25 days. In some cases he injected intramuscularly a mixture of Chloroquine and Emetine at a daily dose of 0·10 Gm. Chloroquine Diphosphate and 0·01 Gm. Emetine Hydrochloride, during 20 days.

"Although all cases were clinically cured, the total and definitive parasitological cure was obtained in 50% of them only, when several bile

and feces examinations after treatment revealed no eggs of Clonorchis sinensis.

Cases treated	10
Cured	5 (50%)
Not cured	5 (50%) "

La Rue, G. R. **The Classification of Digenetic Trematoda: a Review and a New System.** *Exper. Parasit.* New York. 1957, May, v. 6, No. 3, 306–44. [Numerous refs.]

Figueroa, L., Casanueva, M. & Cumsille, E. Distomatosis de las vias biliares. [**Fasciola Infection of the Biliary Tract**] *Rev. Med. Chile.* 1956, Oct., v. 84, No. 10, 561–4.

An account of 12 cases.

Dent, J. H. **Cysticercosis cerebri—Cestode Infestation of Human Brain. Report of a Case occurring in Louisiana.** *J. Amer. Med. Ass.* 1957, May 25, v. 164, No. 4, 401–5, 7 figs. [15 refs.]

Van Deinse, A. B. **The Spread of Echinococcosis.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 158–64, 1 diagram. [Numerous refs.]

" The author is of the opinion that he has demonstrated—or at least has made highly feasible—that the spread of echinococcosis in western Europe, North Africa, some Mediterranean countries and Switzerland may best be explained by assuming that Iceland has of old been a starting point of the disease, the ship's dog being responsible for its distribution.

" The extensive trade with Iceland, the whale fisheries, as well as piracy and privateering, were instrumental in spreading the disease—through the medium of ships' dogs—in the course of the centuries."

Bailenger, J. Une zone française d'endémie hydatique: les Basses-Pyrénées. [**An Endemic Zone of Echinococcosis in France: the Basses-Pyrénées**] *Ann. Parasit. Humaine et Comparée.* 1957, Jan.–Mar., v. 32, Nos. 1/2, 21–7. [14 refs.]

The author's conclusions in French are freely translated as follows:—

The economic development of Landes with the almost complete disappearance of sheep-rearing has resulted in a decrease in echinococcosis, whose manifestations are now merely the vestiges of an infection which occurred 40 to 50 years ago. On the other hand, the mode of living in the Atlantic Pyrenees has hardly changed. Stock raising has there maintained its importance and migratory character,

which during the long months has the effect of bringing together in strict isolation, the shepherd, his stock and one or several dogs. In the winter, the development of artificial grass-land keeps the flocks in the lowlands, where the risks of parasitic infections are increased. Moreover, the double aspect of pig-rearing, domestic and *au vert*, together with the coprophagous habits of this animal, make it an intermediate host of some importance.

These different economic factors coincide with the existence of a very active focus of endemic echinococcosis in the Pyrenees, since from medical and veterinary statistics it ranks as one of the most heavily infected regions in Europe with an index of 5·3 cases per 100,000 people and with annual percentages of 20 to 40 in cattle, 10 to 20 in sheep and 3 to 10 in pigs. For this reason it cannot be said that echinococcosis does not exist in France, a serious statement since hygienic measures which are permitted in other countries for the eradication of this disease are hindered. It is time that measures were taken in the Pyrenees to ensure that the livestock continues to prosper without danger to the health of the people. *J. J. C. Buckley*

Lippi, M. La terapia medica della echinococcosi dell'uomo. Rivista sintetica. [**Medical Treatment of Echinococcosis in Man. A Review**] *Arch. Ital. Sci. Med. Trop. e Parasit.* 1957, Mar., v. 38, No. 3, 134–44. [16 refs.] English summary (2 lines).

Mankau, S. K. **Studies on *Echinococcus alveolaris* (Klemm, 1883), from St. Lawrence Island, Alaska. I. Histogenesis of the Alveolar Cyst in White Mice.** *J. Parasitology.* 1957, Apr., v. 43, No. 2, 153–9, 6 figs. on 2 pls.

"The developmental stages of the larval cyst of *Echinococcus alveolaris* in the liver of white mice are described in detail. The cysts are malignant in nature, invading increasing amounts of the host tissue by exogenous and endogenous budding until the death of the host occurs. Scolex production was observed only after the fourth month of infection."

Fain, A. Cénurose chez l'homme et les animaux due à *Taenia brauni* Setti au Congo Belge et au Ruanda-Urundi. I) La cénurose chez les animaux sauvages, avec existence de localisations cérébrales. [**Coenurus of *Taenia brauni* in Man and Animals in the Belgian Congo and Ruanda-Urundi. I. Coenurus in Wild Animals, with Cerebral Localization**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 673–7.

The author's summary in French is freely translated as follows:—

The discovery of *Taenia brauni* Setti in Ruanda-Urundi is recorded by the author who had previously (*Rev. Suisse Zool.*, 1952, v. 59, 487)

worked out the life cycle of this tapeworm in the Ituri region. Most of the dogs examined in Ruanda-Urundi harboured the parasite and the coenurus was found in 6 new wild animals and in man. [The wild hosts are 5 rodents, *Rattus r. rattus*, *Tachyoryctes ruandae*, *Otomys irroratus vulcanius*, *Grammomys surdaster* and *Dendromus pumilio lineatus*, and 1 monkey, *Cercopithecus mitis doggetti.*] In the rodents the coenuri are usually subcutaneous and sometimes in the pleural or abdominal cavities. In 3 rats a coenurus was found in the brain. The monkey harboured 3 coenuri, one in the brain, one in the heart and one under the skin. In the 8 cases of human infection the coenurus was subcutaneous. The author indicates that cerebral infection in man may be possible.

While working on the life-cycle of *T. brauni* the author observed that the young larvae, having hatched from the eggs, invade the lungs of the intermediate hosts during their migration, presumably to undergo a preliminary development. This stage in the lungs, which is well known to occur in certain larval nematode parasites, does not seem to have been observed before in cestode larvae. *J. J. C. Buckley*

Fain, A., with the collaboration of N. Denisoff, L. Homans, G. Questiaux, L. Van Laere & M. Vincent. Cénurose chez l'homme et les animaux due à *Taenia brauni* Setti au Congo Belge et au Ruanda-Urundi. II) Relation de huit cas humains. [**Coenurus of *Taenia brauni* in Man and Animals in the Belgian Congo and Ruanda-Urundi. II. An Account of 8 Human Cases**] *Ann. Soc. Belge de Méd. Trop.* 1956, Oct. 31, v. 36, No. 5 *bis*, 679–96, 25 figs. on 8 pls.

The authors' summary in French is freely translated (in part) as follows:—

8 cases of human coenurosis were observed, 7 in Ruanda-Urundi and 1 in the Belgian Congo. In every case the coenurus was solitary and was situated subcutaneously. In 4 of the patients it was situated intercostally and in the other 4 in some other part of the trunk. The size varied from that of an almond to that of a plum and the shape was spherical or elongated.

Of the 8 patients, 7 were young children aged from 11 months to 5 years and 1 was a boy of 14 years. All the patients were indigenous Africans (Mutuki, Mukutu or Marega).

It could not be proved experimentally that these coenuri were the larval stages of *Taenia brunai* Setti, but on epidemiological and morphological grounds they clearly belong to this species. *T. brauni* is widespread in dogs throughout East Congo and Ruanda-Urundi. This species and *T. hydatigena*, which is much rarer, are the only representatives of the genus *Taenia* found in dogs in these regions.

Coenurus brauni differs from *C. cerebralis* in the size and shape of the hooks which are larger in the former species and the guard is not bilobed

in the latter; also in the kind of host and the site of parasite (in the brain of sheep in *C. cerebralis*). *C. brauni* differs from *C. serialis* in several features, such as the constant absence of daughter cysts, the shape of the large hooks (posterior border not sinuous) and the kind of intermediate host (rats instead of rabbits).

The coenurus from man described by Taramelli and Dubois (1931) should be assigned to the species *T. brauni*. *J. J. C. Buckley*

Chandler, A. C. & Pradatsundarasar, A. **Two Cases of *Raillietina* Infection in Infants in Thailand, with a Discussion of the Taxonomy of the Species of *Raillietina* (Cestoda) in Man, Rodents and Monkeys.** *J. Parasitology.* 1957, Feb., v. 43, No. 1, 81–9, 3 figs. on pl. [34 refs.]

"Three well-preserved specimens of tapeworms of the genus *Raillietina* were obtained by the junior author from children in Bangkok. One worm was passed spontaneously from a 2-year-old child in a liquid stool, without any drug having been administered. . . . The other 2 worms were spontaneously passed some time previously by a 5-year-old child who was a private patient of a pediatrician in the city." The worms were preserved when fresh and in good condition, unlike those previously described from man in the Far East, and hence a detailed description of them is given. Their taxonomic status is discussed at length and the difficulties of identifying the species with any previously described forms is clearly brought out. "In view of these considerations it seems to us that the best course to follow is tentatively to give our worms from man in Bangkok a distinctive name until such time as the taxonomic tangle involved has been straightened out, even though it is possible, perhaps even probable, that this name will eventually become a synonym of one of those mentioned above [*e.g.*, *Taenia madagascariensis* Davaine found by Leuckart in an infant in Bangkok in 1891]. For the time being, therefore, we suggest the name *Raillietina* (*R.*) *siriraji*, in in honour of the hospital where these worms were obtained."

[See also this *Bulletin*, 1956, v. 53, 1453.] *J. J. C. Buckley*

Komiya, Y., Yasuraoka, K. & Sato, A. **Survival of *Ancylostoma caninum in vitro* (I).** *Japanese J. Med. Sci. & Biol.* 1956, Dec., v. 9, No. 6, 283–92, 6 figs. (1 on 2 pls.).

"1. Among various physiological saline solutions, Krebs-Ringer's bicarbonate solution was most efficient for the survival of *A. caninum* worms. Addition of glucose to the solution resulted in a marked increase in their survival time.

"2. The survival time of worms maintained in whole serum did not

differ significantly from that of worms maintained in 50% or 75% diluted serum.

"3. In dog serum at 37°C the longest time of survival was 6 weeks in the male and 12 weeks in the female. Addition of blood cells to the serum gave no effect on survival time.

"4. Copulation *in vitro* took place in dog serum at 37°C, and fertilized eggs were found until the 54 day."

TARNAY, T. J., YARDLEY, J. M., GUICHERIT, I. D. & BROWN, H. W. **Therapy of Ascariasis with Piperazine and Purgative.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 176–80.

"A saline purge of Phospho-Soda given either 8 or 24 hours after piperazine citrate has a slight demonstrable effect on the efficacy of the therapy in light ascaris infection. Against heavy infections the purge may be of value but our data are based on a small group of patients and are only suggestive. Purgation appears to add little to the therapeutic effect of piperazine and it complicates therapy, especially in mass treatment programmes."

[See this *Bulletin*, 1956, v. 53, 1149, 1368.]

FUHRMANN, G. Zur Frage der Resorption und Ausscheidung von Piperazinsalzen. [**Absorption and Excretion of Piperazine Salts**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 83–90, 1 fig.

The literature on the use of piperazine salts as anthelmintics is now considerable. STANDEN [this *Bulletin*, 1955, v. 52, 1004] found that the citrate, phosphate and adipate salts of piperazine were equally active *in vitro* against *A. lumbricoides*. HARTLEY [*loc. cit.*] has commented on these findings and maintains that *in vivo* somewhat different results are obtained because of the contrast in solubility of these different salts in the gastric contents. The present author has therefore investigated the absorption and excretion of the soluble citrate and the less soluble adipate in 8 volunteers as measured by the excretion of piperazine in the urine, after oral administration.

The citrate was given in solution and the adipate, which crystallizes well, in solid form, in amounts corresponding to 1,000 mgm. piperazine base. Urine was collected for a period of 24 hours after drug administration, since after that time only traces of the drug were detectable. After a period of 3 days without drug, the tests were repeated until each patient had had 3 courses of the citrate and adipate. The method of estimation depended on the development of an orange colour when

piperazine is mixed with 1:2-naphthoquinone sodium sulphonate in presence of an alcoholic solution of borax. The intensity of colour was measured photometrically and compared with that of a suitable control.

It was established that there is no difference in the amounts of piperazine excreted whichever salt is given. It would appear also that the two salts must be equally well tolerated and equally efficient as anthelmintics when equal amounts of base are present. *J. D. Fulton*

Bruijning, C. F. A. **Notes on *Lagochilascaris minor* Leiper, 1909.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1957, June, v. 9, No. 2, 173–5, 1 fig.

"(1) *Lagochilascaris* has never been observed in the intestines of *Felis nebulosa* or in *Felis onca*. Moreover, the spotted leopard is an Asiatic and not an American species. Contrary to the general belief, the normal host of *L. minor* is not known.

"(2) Eggs with living larvae up to nine days old were fed to guinea-pigs and young cats. The cats died shortly afterwards. No infections were observed in the guinea-pigs.

"(3) Inserting female worms and eight-day-old eggs into scarifications in the neck of guinea-pigs had negative results.

"(4) The worms are able to reproduce readily in the abnormal habitat."

[See this *Bulletin*, 1956, v. 53, 1150.]

Schwabe, C. W. **Observations on the Respiration of Free-Living and Parasitic *Nippostrongylus muris* Larvae.** *Amer. J. Hyg.* 1957, May, v. 65, No. 3, 325–37, 1 fig. [14 refs.]

Schwabe, C. W. **Effects of Normal and Immune Rat Sera upon the Respiration of Free-Living and Parasitic *Nippostrongylus muris* Larvae.** *Amer. J. Hyg.* 1957, May, v. 65, No. 3, 338–43, 2 figs. [11 refs.]

Jarniou, A. P. & Moreau, A. Eosinophilie pulmonaire tropicale et filariose. [**Tropical Pulmonary Eosinophilia and Filariasis**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1957, Nos. 11, 12 & 13, 316–29. [Numerous refs.]

The authors record 2 more cases in which the characteristic signs of tropical eosinophilia (eosinophilic lung) were found in association with

lymphadenopathy due to *Wuchereria malayi* [see also this *Bulletin*, 1954, v. 51, 1082]. The clinical histories are of particular interest in that the patients did not respond to treatment by arsenicals but recovered after treatment by diethylcarbamazine. The authors suggest that *W. malayi* may be the cause of many cases diagnosed as tropical eosinophilia.

[Diethylcarbamazine has also been found to be effective in patients in whom filariasis has not been diagnosed, *ibid.*, 1957, v. 54, 617.]

Frederick J. Wright

Simpson, E. J. B. **Mass Therapy in Filariasis. A Note on Control in Niue Island.** *New Zealand Med. J.* 1957, Apr., v. 56, No. 312, 136–7.

In 1954, 748 adults on Niue, Cook Islands, were surveyed for the presence of microfilariae and 22·1% were positive. The examinations were made in the morning (in Niue microfilariae are found at all times during daylight and there is no nocturnal periodicity).

In January 1956 mass therapy with diethylcarbamazine was started. Every person on the island received a single tablet of 50 mgm. each month. It is noted that in symptomless carriers, a small dose often resulted in pain in the limbs and joints within 24 hours: this was relieved rapidly by 50 mgm. diethylcarbamazine thrice daily for 2 weeks with a week's interval between each week of treatment. This resulted in disappearance of microfilaraemia. In November–December 1956, 2,791 persons from the age of 6 years were examined and 2·9% were positive. They were given an immediate and full course of treatment.

The author does not claim that this low percentage of microfilaraemia can be attributed solely to the effect of diethylcarbamazine, for the people have a high standard of village cleanliness, there are regular monthly mosquito control days and annual house spraying with dieldrin (the last probably plays only a small part, as the mosquitoes are mostly bush-dwellers).

The author is not in a position to say whether these small monthly doses of diethylcarbamazine give direct protection to persons without microfilaraemia but this mass treatment does provide a fair means of identifying positive carriers each month, thus ensuring full treatment. It may therefore reasonably be assumed that the rapid fall in the number of carriers may be due to a reduction in the number of mosquitoes containing infective larvae. In any case, the results have been most encouraging.

H. J. O'D. Burke-Gaffney

Jaswant Singh & Raghavan, N. G. S. **Diethylcarbamazine. A Review.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1957, Jan., v. 5, No. 1, 35–69. [Numerous refs.]

Kershaw, W. E., Plackett, R. L., Moore, P. J. & Williams, P. **Studies on the Intake of Microfilariae by their Insect Vectors, their Survival, and their Effect on the Survival of their Vectors. IX.—The Pattern of the Frequency of the Blood-Meals taken in by *Chrysops silacea* and of the Survival of the Fly in Natural Conditions in the Rain-Forest of the British Cameroons and on a Rubber Estate in the Niger Delta.** *Ann. Trop. Med. & Parasit.* 1957, Mar., v. 51, No. 1, 26–37, 1 map & 5 figs. [13 refs.]

Some of the previous papers in this series concerned with the population dynamics of the filarial infections have dealt with particular aspects of the transmission of *Loa loa* [this *Bulletin*, 1954, v. 51, 963; 1955, v. 52, 186, 1125; 1957, v. 54, 853].

The present paper concerns two factors the study of which is necessary before the fortunes of the parasite can be followed quantitatively after it has been taken up from the peripheral blood of man, through its development in the vector to the infective form when it has the opportunity of again becoming deposited in man. The two factors are the pattern of the frequency of the blood meal and the pattern of the survival of the flies in natural conditions.

The stage of development of the parasite can be assessed in flies coming to bite man in natural conditions, and it is thereby possible to deduce the interval which has elapsed since that particular blood-meal was taken. Hence the pattern of the frequency of the blood-meals taken in by a population of *Chrysops silacea* can be defined.

The authors demonstrate that the pattern of biting of infected flies over 10 or more days is made up of two components, which merge: (a) a population of flies which feed in the first 3 or 4 days after an infecting meal, and again in the last 3 or 4 days, and which, when coming to bite and transmit the infection, contain infective larvae recognizable as at least 10th-day forms (though they are probably 12 days old or more); and (b) a population which feed about the 5th day after an infecting meal and come in again to transmit the infection about the 10th day, when the infective larvae have only just completed their development.

The available evidence suggests that flies which have rid themselves of the infective forms of *L. loa* rarely, if ever, survive to take up another blood-meal. If this view be accepted, then from that pattern the survival of the flies in natural conditions can be assessed by empirically fitting different rates of mortality to the two components in the biting pattern, and by comparing the predicted number of survivors with the observed number.

In natural conditions the mortality rate is of the same order as in laboratory conditions. While the rate of mortality in the laboratory increases with age, it is not possible, with the data at present available, to determine whether in natural conditions also it increases with age, or whether it is constant. *R. M. Gordon*

Fawdry, A. L. **Onchocerciasis in South Arabia.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, May, v. 51, No. 3, 253–6, 2 figs.

This is the first account of the recognition of onchocerciasis in Arabia; it is, in fact, the first instance of its recognition outside Africa and Central America. Endemic foci apparently exist in mountain areas of the Yemen, where, surprisingly, a few isolated, fertile valleys exist carrying permanent streams suitable for the breeding of *Simulium*, though in fact there is no record of this fly having been found.

The disease manifests itself as an itching dermatitis of the leg, called *soda* by the Arabs, from *aswad* meaning black. It has been known as a clinical entity by doctors working in mission and government hospitals in the Aden Protectorate for some years.

The lesion begins with itching and slight swelling of the skin; scratching introduces a secondary pyogenic infection which may become impetiginous. The femoral group of lymphatic glands enlarge, whether or not secondary infection has occurred. The skin becomes coarse, thickened and inelastic, and its colour darkens, to give the disease its local name.

Appearing first below the knee, the characteristic changes spread up the leg and may reach the iliac crest. Both legs may be involved, usually successively. The lesion has not been found to spread on to the trunk above the iliac crest, and no case of eye involvement has been seen. Onchocercal nodes are uncommon, having been found only in 5 out of 50 typical examples of the disease. Adult worms were demonstrated in all 3 nodes which were excised: those identified proved to be *O. volvulus*. Microfilariae were scanty in the affected skin, and were found only in 3 out of 10 cases. [This should cause little surprise, since the patients only presented themselves at a stage when an inflammatory reaction of the skin was well established; at this advanced stage, microfilariae are always rare.]

A high eosinophilia was almost always found.

The disease is self-limiting, for infection appears to die out in 2–5 years.

Treatment with Banocide [diethylcarbamazine] has been initiated, and has in each case confirmed the clinical diagnosis by causing an acute exacerbation of itching and swelling in the affected area of skin.

[Arabia is a country of innumerable paradoxes: few would have believed that so arid a region would contain areas able to support a population of *Simulium*, for whose breeding, clean, flowing water is essential.] *J. H. Walters*

Crosskey, R. W. **Man-Biting Behaviour in *Simulium bovis* De Meillon in Northern Nigeria, and Infection with Developing Filariae.** *Ann. Trop. Med. & Parasit.* 1957, Mar., v. 51, No. 1, 80–86, 1 map. [12 refs.]

During a survey of breeding places of *S. damnosum* in the Gurara and Tapa rivers, Northern Nigeria, a second man-biting species, *S. bovis* [= ? *S. faini*], was found [this *Bulletin*, 1957, v. 54, 596]. Adults of this species were captured from July to September more frequently than adults of *S. damnosum*. Small swarms of *S. bovis* were observed following human bait, although only a small proportion of these swarms actually bit man. Most biting took place in the open, or in light shade, from 8.00–10.00 hours and again in the late afternoon up to 18.00 hours. As with *S. damnosum* the legs were bitten more frequently, although *S. bovis* was a more "nervous" feeder than *S. damnosum*. The normal host of *S. bovis* is thought to be cattle. Adult flies were caught up to 14 miles from their known breeding places.

In the area surveyed approximately 70% or more of the human population are infected with onchocerciasis. Out of 116 female *S. bovis* dissected 7 (6%) were found to be infected with filarial worms, morphologically the same as *Onchocerca volvulus* developing in *S. damnosum*. Both "sausage" and infective forms were found in the thorax, but no infective forms were found in the head. In the same area, and during the same period, 3 out of 50 female *S. damnosum* were found to contain "sausage" stage larvae assumed to be *O. volvulus*. The author points out that, although *S. bovis* has not been shown to transmit *O. volvulus*, in an area of heavy onchocerciasis where the density of *S. damnosum* was usually low *S. bovis* was found to bite man frequently and consequently could have been acting as a vector. It has not been possible to investigate further the role of *S. bovis* as a vector of onchocerciasis in this area as control measures against *S. damnosum* in the Tapa river have also largely eliminated the population of *S. bovis*.

B. R. Laurence

Massi, O. Un caso di trichinosi nel suino osservato al mattatoio di Roma. [**A Case of Porcine Trichinosis seen in the Rome Abattoirs**] *Nuovi Ann. d'Igiene e Microbiol.* 1957, Mar.–Apr., v. 8, No. 2, 168–70. [12 refs.] English summary (2 lines).

Sadun, E. H., Norman, L. & Brooke, M. M. **The Production of Antibodies in Rabbits infected with Irradiated** *Trichinella spiralis* **Larvae.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 271–9. [20 refs.]

"Rabbits that received single inoculations by mouth of irradiated larvae of *Trichinella spiralis* failed to produce antibodies in sufficient amounts to be detected by the flocculation and complement-fixation tests. Multiple feedings with irradiated larvae produced a positive serology at low titers and of brief duration. Extra-intestinal larval

inoculations stimulated the production of antibodies in relatively high titers. A re-evaluation of the significance of positive serology in trichinosis might become necessary if the recommendation of commercially irradiating pork as a means of protecting human beings from trichinosis should be widely adopted."

SADUN, E. H. & NORMAN, L. **Metabolic and Somatic Antigens in the Determination of the Response of Rabbits to Graded Infections with** *Trichinella spiralis*. *J. Parasitology*. 1957, Apr., v. 43, No. 2, 236–45, 3 figs. [17 refs.]

"Several groups of rabbits were infected with graded doses of *Trichinella larvae* varying from 500 to 400,000 larvae. The 50% lethal dose under the experimental conditions was 88,600. The size of inoculum had a direct relation to the percent mortality in each group and an inverse relation to the average length of survival.

"Infected rabbits were bled weekly, and the sera were tested by the bentonite flocculation reaction using metabolic and purified somatic antigens. With both antigens, the time interval from inoculation to the first positive serology was inversely related to the size of inoculum. The geometric mean of the titer increased rapidly from the first weeks following inoculation up to about 2 months and thereafter it decreased gradually. The peak titer was directly related to the size of inoculum and was higher with the metabolic antigen. Although a great similarity of results with the two antigens was observed, the metabolic antigen conferred to the flocculation test a somewhat greater sensitivity. This greater sensitivity was observed in experimentally infected rabbits, in rabbits artificially immunized with somatic or metabolic antigens, and in those which were infected with the intestinal phase of infection alone. The metabolic antigen did not give a more sensitive test with sera from rabbits infected with the muscular phase alone."

[See this *Bulletin*, 1956, v. 53, 1371.]

HAEMATOLOGY

THOMPSON, R. B. **Seasonal Incidence of Megaloblastic Anaemia of Pregnancy and the Puerperium.** *Lancet*. 1957, June 8, 1171–2, 1 fig. [14 refs.]

"A study of 100 cases of megaloblastic anaemia of pregnancy has shown an increased incidence of the disorder during the winter and

spring months. This suggests that dietary deficiency is at least a contributory cause of the disorder."

Silvestroni, E. & Bianco, I. Il censimento della popolazione microcitemica del Delta Padano risultati di nuove ricerche sulla popolazione di Lagosanto e di Ambrogio. [**Survey of Microcytaemia in the Po Delta. Results of Studies in Lagosanto and Ambrogio**] *Igiene e San. Pubblica.* Rome. 1957, Jan.–Feb., v. 13, Nos. 1/2, 3–8. [16 refs.]

The English summary appended to the paper is as follows:—

"In order to realize a complete blood finding census regarding the microcytaemia cases among the population of the delta of the Po the authors have performed a survey in two other communities of the Basso Ferrarese: Lagosanto and Ambrogio.

"In Lagosanto they have found on a whole of 3001 examined persons a microcytaemia rate of 17·57 p. cent, and in Ambrogio on a whole of 1955 persons a rate of 15·39 p. 100. Moreover the authors emphasize the exceedingly high infant mortality in the families having members suffering from Cooley's disease. This mortality was found to reach the highest rate of 38·41 p. cent in Lagosanto and 35·48 p. 100 in Ambrogio. In these two communities, as in the others already examined, more than a half of the microcytaemia patients possess a pale complexion and suffer frequently from asthenia."

Nail, S. K., Kothari, B. V., Jhaveri, C. L., Sukumaran, P. K. & Sanghvi, L. D. **Fatal Hemolytic Anemia presumably due to the Combination of Sickle Cell and Thalassemia Gene. Case Report.** *Indian J. Med. Sci.* 1957, Apr., v. 11, No. 4, 244–9, 3 figs. [12 refs.]

"A fatal case of hemolytic anemia in a Gujarati Hindu woman from Saurashtra is described. The severe hemolytic syndrome in the patient was associated with filamentous type of sickling of erythrocytes with an electrophoretic pattern indistinguishable from that of sickle cell anemia, and one of the brothers showed a picture characteristic of thalassemia trait. The mother—the only living parent—who carried the trait showed holly-leaf pattern of sickling. The various possibilities of a double heterozygous condition are discussed and reasons are given for a presumptive diagnosis of microdrepanocytic disease."

Heinemann, H. O. & Cheung, M. W. **Renal Concentrating Mechanism in Sickle-Cell Anemia.** *J. Lab. & Clin. Med.* 1957, June, v. 49, No. 6, 923–7. [16 refs.]

Crowley, Mary F., McSorley, J. G. A., Aksoy, M. & Lehmann, H. **The Demonstration of a Haemoglobin E-Like Compound in some Cases of Thalassaemia.** Reprinted from *Vox Sanguinis.* 1957, v. 2, No. 1, 53–9, 3 figs. [12 refs.]

On paper electrophoresis of the haemoglobin from 14 people with thalassaemia major or minor, a small component could be demonstrated having the mobility of haemoglobin E at *p*H 8·6 and 6·8. This fraction was not found in all cases of thalassaemia, nor in many hundreds of normal bloods. Three interesting points are made. (1) The E-like component was demonstrable in the 4 patients with thalassaemia major, who had foetal haemoglobin levels of from 13% to 90%, this being contrary to the findings of Kunkel and Wallenius [this *Bulletin*, 1956, v. 53, 488]. (2) Its presence in a case of sickle-cell—thalassaemia suggested that its formation was not under the control of the genetic locus for haemoglobins A and S. (3) Finally, details are given of two families in each of which one individual showed the E-like component without any other abnormality; yet in one case it was certain and in the other likely, that the possessor of this minor haemoglobin variant had transmitted a thalassaemia gene to his children. *Alan B. Raper*

Raper, A. B. **Unusual Haemoglobin Variant in a Gujerati Indian.** *Brit. Med. J.* 1957, June 1, 1285–6, 1 fig. [14 refs.]

This work is a continuation of a survey of Indians living in Uganda. Examining 174 non-related Gujerati, Jacob *et al.* [this *Bulletin*, 1956, v. 53, 1166] found 2 with haemoglobin A and D. In the present investigation 326 Indians living in and near Kampala, Uganda, were examined. Nearly all were immigrants from the Bombay region of India and a few Sikhs and Punjabis were included. 2 examples of haemoglobin D were discovered; thus the total of Uganda Indians investigated is now 500 and among these the number of examples of haemoglobin D now becomes 4.

In addition 1 woman showed an abnormal haemoglobin which was identified as haemoglobin J. Haemoglobin J was first discovered in an American Negro, was then seen in Liberia and has also been found in an Indonesian family. The present investigation continues, as it were, the survey and establishes the presence of the gene for haemoglobin J in the Indian mainland. *H. Lehmann*

Ager, J. A. M. & Lehmann, H. **Haemoglobin K in an East Indian and his Family.** *Brit. Med. J.* 1957, June 22, 1449–50, 3 figs. [27 refs.]

"An abnormal haemoglobin was discovered in a South African of Indian extraction living in London. The haemoglobin had the

electrophoretic properties of haemoglobin K. One son showed the same abnormality."

VENOMS AND ANTIVENENES

Perret, J. L. & Mertens, R. Étude d'une collection herpétologique faite au Cameroun de 1952 à 1955. [**Study of a Collection of Snakes from the Cameroons obtained between 1952 and 1955**] *Bull. Inst. Français d'Afrique Noire.* 1957, Apr., v. 19, No. 2, 548–601, 8 figs. [17 refs.]

Stahnke, H. L., Allen, F. M., Horan, R. V. & Tenery, J. H. **The Treatment of Snake Bite.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 323–35, 8 figs. [32 refs.]

The authors point out that the treatment of pit-viper bite should aim at two things: the prevention of rapid absorption of the toxin and the control of local tissue destruction. With regard to the latter they state: "The most commonly recommended treatment for snake bite, i.e., the tourniquet, multiple incision, and suction (popularly known as the tourniquet, cut and suction method) does very little to alleviate the problem of tissue destruction, and does in fact aggravate it. In the hands of the layman the T.C.S. technique is generally very destructive and even in the hands of the most skilled, this treatment gives the average physician no choice but to let the enzymatic action take its course and hope that the tissue destruction will not be too great before the enzymes are neutralized through natural processes."

Details of two cases are given. In both, the thumb was bitten. In one the usual methods of first-aid were applied; in the other, immediate ligature applied to the bite was followed by "cryotherapy", *i.e.* immediate immersion of the affected limb in "a five gallon can filled with ice and water" and eventual packing of the member in chipped ice. The ligature was removed after 9 minutes. Permanent injury resulted in the first case; a functional thumb was obtained in the second.

The authors describe the use of refrigeration in snake bites and recommend its application as a method of first-aid and early treatment as follows (the example being a bite on a finger):

1. Place a ligature between the bite and the body and cover the bitten area with ice.
2. Immerse the limb to well above the bite in iced water and, after not less than 5 minutes, remove the ligature, keeping the limb in the iced water for at least 2 hours.
3. Pack the limb in finely crushed ice for a minimum of 24 hours.

This technique will " prevent a too rapid absorption of the lethal neurotoxic factor and prevent tissue destruction by the enzymatic action of the venom ". One important psychological point is that prompt refrigeration stops the otherwise very severe local pain at the site of the bite.

The patient should be kept otherwise warm since the circulation in the iced limb is regulated to some extent by the general body circulatory state. Warming up after cryotherapy should be gradual.

Antivenene must be given as soon as possible and with proper precautions with regard to serum sensitivity. Local injection of antivenene is not recommended, especially if the tissues are oedematous.

Incision and suction are useful only if properly performed and then only after a period of refrigeration. Tissue damage and permanent deformities from nerve injuries etc. often result from inexpert incisions. In the authors' view, " The delay of absorption by a ' venous ' or loose tourniquet is imaginary or unimportant ". According to them, the dangers of refrigeration are grossly exaggerated. *B. G. Maegraith*

MARSHALL, T. K. **Wasp and Bee Stings.** *Practitioner.* 1957, June, v. 178, No. 1068, 712–22. [18 refs.]

The author gives an excellent account of wasp and bee stinging, dealing with the stinging mechanisms, the pharmacological properties of the venoms (little is known of wasp venom), the local reaction to stinging and the toxic and anaphylactic elements of more general reactions. Hypersensitivity and desensitization are discussed in a well-documented review, and details of treatment are given.

A case report describes the death of an adult 15 minutes after stinging by wasps (only one sting-site was found at autopsy). Pathological findings in this and other fatal cases and in the locality of stings are discussed. In the author's case pulmonary emphysema and areas of collapse were observed; in others emphysema or oedema may predominate. The cause of death in such cases is thought to be allergic shock. The sites of stings cannot always be determined.

Generalized reactions follow either very large doses of venom from large numbers of stings or after small doses (even after a single sting, as in the case quoted). In the former event (the toxic reaction), the clinical picture " resembles that of rattlesnake poisoning ", the venom having haemolytic, haemorrhagic, neurotoxic and histamine-like effects. In the latter event symptoms of allergic shock develop very quickly, in the course of 20–30 minutes. Death has been reported in two minutes. Hypersensitivity is believed to be due to a water-soluble protein derived from the bee's body and not from the toxin itself. Hypersensitivity is acquired in a few days in many cases by consecutive stinging. Some patients who develop hay fever near bee hives etc. have become sensitive to bee-antigen dispersed in the air.

Since wasps are scavengers, their stings may introduce bacterial infection which can cause serious complications. This is unlikely in the case of bee stinging. *B. G. Maegraith*

Prats, F. & Schenone, H. Mordeduras de arañas. Nuevas consideraciones sobre Loxoscelismo. [**Spider Bite. Further Considerations on Loxoscelism**] *Bol. Chileno de Parasit.* 1957, Jan.–Mar., v. 12, No. 1, 7–9, 1 fig. [10 refs.]

The English summary appended to the paper is as follows:—

"The authors present a review of the epidemiological and clinical aspects of the condition produced by the *Loxosceles laeta*'s bite. This spider lives specially on the walls of the old houses. It has been found in Chile, Uruguay, Perú and Argentine. The two clinical forms of loxoscelism are described: a local form with cutaneous necrosis at the bite's site; and a severe systemic form with general malaise, hemolysis, hemoglobinuria and hematuria. Many cases of cutaneous arachnidism have been successfully treated with antihistaminic drugs. Cortisone is indicated in systemic cases with hemoglobinuria."

TOXOPLASMOSIS

Trans. Roy. Soc. Trop. Med. & Hyg. 1957, Mar., v. 51, No. 2, 93–122. **Symposium on Toxoplasmosis** (arranged by P. C. C. Garnham). **Introduction** [Garnham, P. C. C.], 93–5, (21 refs.). **I. Clinical and Epidemiological Aspects of Toxoplasmosis** [Beattie, C. P.], 96–103, 2 figs., (52 refs.). **II. An Appraisal of the Diagnostic Value of the Serological Tests for Toxoplasmosis** [Cathie, I. A. B.], 104–10, (25 refs.). **III. The Demonstration of *Toxoplasma* in Animals, with particular reference to Members of the Mustelidae** [Lainson, R.], 111–17, (30 refs.). Discussion 118–22 [Beverley, J. K. A.; Fulton, J. D.; Baar, H. S.; Walters, J.; Middlemiss, J. H.].

Introducing the symposium P. C. C. Garnham referred to the desirability of further investigations in the tropics on toxoplasmosis, particularly in regard to the diagnosis of cases of the disease, the incidence of past infection as revealed by serological tests and the incrimination of animal reservoirs. He drew attention to the possibility that the dye test (on which much epidemiological evidence is based) was not completely specific for *Toxoplasma*, in that under certain circumstances it gave positive reactions with the serum of animals infected with

Sarcocystis, an organism with which meat-eaters come into contact nearly every day of their lives [but see Cathie below].

I. The severe forms of toxoplasmosis were the first to receive attention, and the tetrad of signs, hydrocephalus or microcephaly, choroidoretinitis, convulsions and cerebral calcifications with changes in the cerebrospinal fluid, was easily recognized as being highly characteristic of the congenital form of the disease. 110 of such cases have been diagnosed in two centres in the United Kingdom between the years 1950 and 1956, representing an incidence of at least 1 in 35,000 births. Milder types of the disease occur as illnesses associated with lymphadenopathy with or without fever, and 20 such cases were seen by the author (Dr. Beattie) and Dr. Beverley; toxoplasmosis was in fact found by them to be responsible for 8% of cases of lymphadenopathy of unknown origin. Fever alone may be the sole manifestation.

The mode of transmission still remains unknown, though (a) arthropod vectors are unlikely to be concerned and (b) association with infected animals seems to play an important part. On 4 occasions, the author found human cases to be associated with sickly cats, in all of which the dye test was positive in high titre. In England, the dye-test incidence in the adult human population (as determined by Dr. Beverley) was nearly twice as high in rural as in urban districts.

Toxoplasma gondii for the most part appears to be harmless to man; stresses, either morbid (such as malaria, bartonellosis, virus diseases) or physical, may convert a latent into an overt infection.

II. This useful paper by I. A. B. Cathie takes one a step further in the interpretation of serological tests as evidence of toxoplasmosis. A complement-fixation test titre of 1 in 8 is regarded as evidence of the active disease; but the question of titres is not discussed at length here, the principal concern being the specificity of the tests.

Of 70 patients infected with *Trypanosoma gambiense* (as supplied by Dr. F. Evens from the Belgian Congo) only two gave a positive dye-test at 1 in 16 or less; of 15 patients with *T. cruzi* (as supplied by Prof. M. P. Barretto from Brazil) 6 were positive at a low titre.

Of 53 sera containing agglutins to *Salmonella typhi*, all gave a negative complement-fixation test (with an egg antigen) to *Toxoplasma*; of 76 sera from patients with malaria (as supplied by Dr. J. Luder from Uganda) all were again negative.

Of 69 sheep, the complement-fixation test for toxoplasmosis was negative in all; for sarcosporidiosis (with an antigen prepared by the abstracter) it was positive in more than half; 77% of these sheep gave a positive dye test for *Toxoplasma* in titres up to 1 in 16, but if the sera were inactivated at 56°C. only 50% were positive.

Using *Sarcocystis* spores instead of *Toxoplasma* for the dye test, the author obtained a 100% positive reaction in 116 human sera (which included both positive and negative *Toxoplasma* reactors); but many of the sera were still positive after inactivation by heat (*i.e.* with destruction

of the accessory factor) and thus the reacting substance does not appear to be a " true " antibody.

Inactivation of serum for 30 minutes does not interfere with the dye test in human serum, and the author concludes that sera for this test should be previously inactivated.

III. Demonstration of *Toxoplasma* infection in wild animals often requires a special technique: intraperitoneal inoculation of homogenized brain of pooled animals is made into mice and subinoculations must be carried out at weekly intervals to detect avirulent strains for up to 6 blind passages. *Toxoplasma* was isolated from 1 out of 99 *Rattus norvegicus*, 2 out of 2 weasels, 1 out of 1 ferret and from 2 out of 2 ferret-polecat hybrids. 399 house-mice, 65 jackdaws, 14 pigeons and 6 rooks were apparently negative. The animals were chiefly obtained from Hertfordshire. All the strains were avirulent except for the isolation from the rat. Pseudocysts were found after a long search in the brains of the 5 mustelids. The virulence of the strains could easily be increased to the RH standard by passage through multimammate mice [see this *Bulletin*, 1956, v. 53, 1168–70]. The mustelids probably derived their infections from the consumption of infected animals, *e.g.* rabbits.

In the discussion, J. K. A. Beverley confirmed Cathie's observations that other protozoa failed to produce antibodies co-specific for *Toxoplasma* —*viz.* in 1 human case of sarcosporidiosis and in 3 cases of malaria before and after infection. Dye-test titres of children with choroidoretinitis fall with increasing age. 68% of people with posterior uveitis were positive as compared with 40% controls. Treatment of acute and chronic infections is still unsatisfactory; what works with animals does not necessarily work with man. Apart from the usual pyrimethamine-sulphonamide combinations, cortisone may be useful in exacerbations of chronic lesions.

H. S. Baar and J. H. Middlemiss spoke on cerebral toxoplasmosis, and J. Walters referred to cases of the disease seen in West Africa.

P. C. C. Garnham

Manning, J. D. & Reid, J. D. **Toxoplasmosis in New Zealand. A Serological Survey.** *New Zealand Med. J.* 1956, Dec., v. 55, No. 310, 441–7. **[12 refs.]**

A serological survey of the population of Wellington, New Zealand, was carried out, by means of the *Toxoplasma* dye test and complement-fixation reaction with slight modifications. The tests were performed with great attention to technique, while careful cross-checking of results and repeats were frequently made.

Blood donors, pupil nurses and 9-year-old schoolchildren were tested. There was little difference in the incidence of positives in the sexes. The percentage of people positive to the dye test was 27% between the ages of 16 and 25, 47% at 26 to 35, 56% at 36 to 45, 55% at 46 to 55 and

65% above the age of 56 (258 people were tested). The rate in the children was 33%. Positive titres were counted from 1 in 16 and high titres were found to be unusually frequent. The percentage of positive complement-fixation tests was much lower, and the age incidence was different, the highest incidence (20%) being in the age-group 16 to 25 years, dropping to 5% in people above 56. *P. C. C. Garnham*

SUMMERS, W. A. **The Effect of 2,4-Dimethyl-3-Hydroxy-5-Hydroxymethylpyridine (Desoxypyridoxine) upon Experimental Toxoplasmosis in Mice.** *Exper. Parasit.* New York. 1957, Mar., v. 6, No. 2, 194–201. [14 refs.]

The substance named in the title is an active metabolic antagonist of the vitamin B group of substances for a number of micro-organisms. The present investigation indicated that if included in the diet of mice infected with toxoplasms the death of the host was significantly delayed.

The RH strain of *T. gondii* was used to produce infection by intraperitoneal inoculation of peritoneal exudate from infected mice. The test animals in groups of 6 to 24 were given 0·1 ml. of this exudate diluted 10^{-1} to 10^{-4} times in saline and maintained on a diet adequate in pyridoxine content. It was observed that if 0·1% desoxypyridoxine was included in the diet the life of infected mice was significantly prolonged and they exhibited signs of pyridoxine deficiency 5 to 6 days after the start of treatment. In some cases cures of the infection appeared to have been obtained as indicated by failure to infect fresh animals with suspensions of their tissues. Addition of excess pyridoxine to the diet overcame the inhibiting effect of desoxypyridoxine.

The author concluded that Vitamin B6 was necessary for growth of *T. gondii* but it was not possible to state how the desoxy compound exerted its effect. *J. D. Fulton*

DERMATOLOGY AND FUNGUS DISEASES

FINDLAY, G. H. **Chromoblastomycosis caused by the Simson Species of *Hormodendrum*.** *South African Med. J.* 1957, June 1, v. 31, No. 22, 538–40, 4 figs.

"A case of chromoblastomycosis in a European male from the Transvaal is described, in which *Hormodendrum* species was isolated. This organism has apparently not been recovered here since its original isolation by Simson. Some observations on the tubercle formation in chromoblastomycosis are presented."

[See this *Bulletin*, 1943, v. 40, 630.]

Kakoti, L. M. & Dey, N. C. **Chromoblastomycosis in India.** *J. Indian Med. Ass.* 1957, Apr. 16, v. 28, No. 8, 351–5, 6 figs. on pl.

"A case of chromoblastomycosis of the female external genitalia is recorded for the first time in India.

"This was confirmed by direct, histopathological and cultural examination by finding typical spores in the tissue and by the typical growth in the culture.

"Metastasis which is rare in these cases was noticed in the regional lymph nodes (inguinal lymph nodes).

"The organism was found to be *Hormodendrum compactum* by observation of typical compact types of spores in this case."

Margolis, J. **Disseminated Coccidioidomycosis.** *Amer. Rev. Tuberculosis.* 1957, May, v. 75, No. 5, 828–32, 4 figs.

"A case of disseminated coccidioidomycosis is presented in which the only complaints were pain and stiffness of the neck and back and marked weight loss. A brief review of several salient characteristics of the disease is presented."

HEAT STROKE AND ALLIED CONDITIONS

Sargent, F. & Slutsky, H. L. **The Natural History of the Eccrine Miliarias: a Study in Human Ecology.** *New England J. of Med.* 1957, Feb. 28 & Mar. 7, v. 256, Nos. 9 & 10, 401–8; 451–9, 1 fig. [166 refs.]

The miliarias occur on covered body areas, rarely on the face and never on the hands and soles. The lesions are accentuated by sudorific agents and diminished by agents which reduce sweating.

Miliarias are caused by closure of the sweat-duct pore by horny plugs; subsequently the duct ruptures and sweat extravasates into the surrounding tissues. Environmental factors are sunlight, high temperature and high humidity.

Experimentally, all types of miliarial lesions can be produced by a wide variety of agents which are injurious to the skin. The authors therefore consider that miliaria is a non-specific response to local skin injury. However, there is wide individual susceptibility which has yet to be explained. It has been confirmed that electro-negative and electro-positive agents respectively stimulate and depress sweating in conformity with the theory of a potential gradient from negative at the distal end to positive at the spiral end of the sweat duct.

The following types of miliaria are distinguished: crystallina, rubra, profunda and pustulosa.

Miliaria crystallina

This is an asymptomatic, non-inflammatory eruption of small sweat-containing vesicles in the stratum corneum.

Miliaria rubra

Undoubtedly clothing, occupation and housing, in addition to moist heat, influence the development of miliaria but these probably act by affecting the work load of the eccrine sweat glands. The role of sunlight in aetiology of this type is not certain.

It is now known that all races are susceptible, but persons over 30 years may be more prone. The sexes are equally affected; fair and dark persons appear to suffer equally; the obese are not uniformly more affected than the thin.

Sweating may be normal, increased or reduced, but with repeated attacks hypohidrosis develops. Sweat chloride is said to be high. There is disagreement as to whether a high intake of sodium chloride contributes to its occurrence and little support for the theory that it is a " chloride " rash.

Miliaria profunda

This is a later stage of the miliarial lesion and tends to follow the more severe attacks of miliaria rubra. It is always present in tropical anhidrotic asthenia but may occur without this syndrome.

Sweating is reduced on miliarial lesions and also on free areas although hyperhidrosis may be present on the face. Sweat chloride is greatly increased on affected and free zones.

Tropical anhidrotic asthenia

4 to 7 months in the moist heat are required for this condition to develop. Most patients give a history of miliaria rubra which may coincide with it, or antedate it by as much as 24 weeks. Few cases have been reported outside the armed Forces; hard-working " other ranks " are most prone. Any age, weight or complexion may suffer.

Sweating is virtually absent from miliarial areas: sudorific agents do not provoke sweating on these areas but tend to exacerbate the symptoms. Sweat chloride is abnormally high and remains so for one month after clinical recovery.

Characteristically, while resting or exercising in the sun the patient experiences discomfort, warmth, dyspnoea, tachycardia, palpitation, dizziness, headache and even collapse. There may be pyrexia which rarely exceeds 102 to 103°F. A common feature is urinary frequency and polyuria which does not respond to pituitrin.

Return to normal sweating requires at least 4 and sometimes 12 weeks; there is no specific treatment.

Complications

Impetigo bullosa tropica and hidradenitis may arise in association with miliaria rubra. Boils, impetiginous rash, fungous infections, acneiform eruptions, pitting of hair follicles and even severe progressive disorganization of the skin may complicate the miliarias generally.

Treatment

The only reliable treatment is removal to a cool environment. Preventive measures are to wear loosely fitting clothing, to limit the use of soap and, if possible, to have an air-conditioned rest-space.

The authors believe the miliarias and their complications indicate a breakdown of acclimatization—a dysacclimatization. Centrally there may be neuro-endocrine disturbances but peripherally the basic defect is sweat-gland fatigue.

[See also this *Bulletin*, 1951, v. 48, 79, 923; 1952, v. 49, 82; 1953, v. 50, 968; 1954, v. 51, 838.] *M. L. Thomson*

TROPICAL ULCER

Castellani, A. **The Common Ulcers of the Leg, Cosmopolitan and Tropical.** *J. Trop. Med. & Hyg.* 1957, Mar. & Apr., v. 60, Nos. 3 & 4, 55–62; 91–9, 20 figs. [28 refs.]

The author classifies the common ulcers of the leg as follows.—

A. *Cosmopolitan*:

i. Ulcus varicosum et ulcus varicosoides (varicose and varicosoid ulcer).
ii. Ulcus lueticum (tertiary syphilitic ulcer).
iii. Macroulcus perstans (persistent megalo-ulcer).
iv. Ulcus cuniculogenes (Meleney's burrowing ulcer).

B. *Tropical*:

i. Ulcus tropicum (tropical ulcer, true tropical ulcer).
ii. Ulcus veldis (veld sore, diphtheritic desert sore).
iii. Ulcus pyogenicum vel septicum (septic ulcer due to pyogenic cocci, septic desert sore).
iv. Ulcus tropicaloides (tropicaloid ulcer, mycetoid desert sore).

He limits the term "varicose ulcer" to those essentially resulting from hypo-oxygenation of the tissues caused by venous back pressure and stasis. Where the mechanical element due to varicose veins is only a predisposing cause and the ulcer results from bacterial infection the term varicosoid ulcer is favoured. The author has described a new organism *Bacillus cascainensis* [*Bull. Hyg.*, 1955, v. 30, 366] which he considers may be responsible. The varicosoid ulcers are usually multiple and the outline tends to be angular. Rest in bed does not cause healing

as occurs with the true varicose ulcer and a variety of treatments may be required.

Macroulcus perstans was described by Castellani [this *Bulletin*, 1950, v. 47, 1032] and is an ulcer which begins as the result of a minor injury but gradually enlarges until after some years it reaches a size of 10–20 cm. or more in diameter. Occasionally small areas may become epithelialized or scarred. *Pseudomonas pyocyanea* is present in most cases. The lack of healing differentiates it from a tropical ulcer and treatment has little effect although in one patient it appeared to respond in large part to rest, parenteral penicillin and sulphadiazine powder.

Ulcus cuniculogenes (Meleney's burrowing ulcer) is scarcely a common ulcer but is important because it not only enlarges to an enormous size, with an irregular undermined margin, but it also burrows deeply. The author suggests that a micro-aerophilic haemolytic streptococcus may be an aetiological agent. Treatment is difficult but local zinc peroxide and skin grafting have been employed with success.

The author supports the common view that *Trep. vincenti* and *Fusiformis fusiformis* are jointly involved in the aetiology of the true tropical ulcer, but he appears to the abstracter to underestimate the part played by malnutrition. He supports the simple surgical procedure outlined by Nelson and Semambo [*ibid.*, 1956, v. 53, 1385].

The term ulcus veldis (or veld sore) he suggests should be restricted to cutaneous diphtheria which may rarely be associated with palsies. He maintains that cure is more rapidly achieved by diphtheria antitoxin parenterally and locally than by penicillin. Ulcus pyogenicum or pyogenic desert sore simulates a tropical ulcer or a veld sore but contains only pyogenic organisms.

Ulcus tropicaloides he encountered in 1940–42 in Libya, Cirenaica and latterly in Italy, Spain and Portugal. The lesion begins as a vesicle or bulla. In advanced cases 2, 3, or rarely 4 ulcers, superficial and ovoid about 2 cm. in diameter are found with little discomfort and no lymphangitis. The author believes the cause to be an organism he has described which is now called *Corynebacterium mycetoides*. The ulcers last from 3 to 6 months and treatment is of doubtful value. [The author offers cultures of the two organisms *Corynebacterium mycetoides* and *Bacillus cascainensis* to any interested medical man requesting them.]

Frederick J. Wright

Carayon, A. & Cornet, L. Les complications osseuses des ulcères phagédéniques. (A propos de 76 cas.) [**The Bony Complications of Tropical Ulcers (based on 76 cases)**] *Méd. Trop.* Marseilles. 1957, Mar.–Apr., v. 17, No. 2, 171–223, 10 figs. on 3 pls. [22 refs.]

The authors give a detailed analysis of their experience of bone disease in association with tropical ulcers. They suggest the following classification:—

1. Osteitis due to direct extension of the ulcer (56 examples):
   (a) friable erosions of the periosteum with slight cortical involvement;
   (b) bone showing superficial small sequestra (10 examples);
   (c) bone showing involvement of medulla with central sequestra or involving the whole thickness or the whole of the diaphysis (14 examples).

2. Metastic bone involvement. These resemble osteomyelitis as seen in temperate zones but arise from blood-borne sepsis from tropical ulcers and can be divided into the following types:—
   (a) involvement of the diaphysis at some distance from the ulcer;
   (b) a form producing compact bone like ebony;
   (c) similar to (b) but showing associated necrosis.

These 3 forms are variations of one pathological process and radiologically intermediate types may be demonstrated and tomographs may show sequestra. The tendency to new bone formation leads to the repair of pathological fractures and enables large sequestra to be removed without disaster.

3. Bone lesions complicating tropical ulcers which have become malignant (9 examples):
   (a) local erosion of bone by the carcinomatous ulcer;
   (b) malignant changes supervening on osteomyelitis in association with a tropical ulcer;
   (c) malignant change in a tropical ulcer associated with osteitis;
   (d) coincident osteomyelitis and a malignant tropical ulcer.

For further information as to the pathology, radiological changes and treatment recommended, the original paper should be consulted.

[See also this *Bulletin*, 1956, v. 53, 1174.] *Frederick J. Wright*

Carayon, A. Les gangrènes par ulcère phagédénique en Afrique Noire. A propos de 26 observations. [**Gangrene from Tropical Ulcers in Africans based on 26 Observed Cases**] *Méd. Trop.* Marseilles. 1957, Jan.–Feb., v. 17, No. 1, 54–81, 2 charts & 10 coloured figs. on 2 pls.

The author analyses in detail the factors concerned in 26 patients in French West Africa in whom gangrene complicated phagedaenic ulcers. These patients were observed during the period 1941 to 1946 when chemotherapy was limited to sulphonamides and intra-arterial mercurochrome. It is considered that although antibiotics have reduced the incidence and danger of this complication it is still of sufficiently grave import to justify detailed study. Gangrene of the leg or foot occurred in 24, of the hand only twice. The authors find that gangrene is preceded by spasm, thrombosis, scarring, or ulceration of arteries leading to ischaemia, and that the pyogenic organisms associated with the ulcer are the source of infection dangerous both to the limb and life. It is

concluded that in addition to the use of antibiotics treatment should consist of blood transfusions to overcome anaemia and the use of Novocaine or acetylcholine by local intra-arterial or lumbar injections.

Frederick J. Wright

Castellani, A. **Tropicaloid Ulcer. A General Account.** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 38–46, 8 figs. [21 refs.]

See this *Bulletin*, 1956, v. 53, 659.

MISCELLANEOUS DISEASES

Sliwensky, M. Ein Querschnitt durch die Tropenkrankheiten Bulgariens. [**A Cross-Section of Tropical Diseases in Bulgaria**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1957, v. 8, Nos. 1/2, 246–9.

This paper consists of short, rather scrappy, notes on the incidence and epidemiology in Bulgaria of the following conditions: actinomycosis (mostly cutaneous, very rarely systemic); amoebiasis (no up-to-date information given); bacillary dysentery (*Shigella dysenteriae* 1 and 2, *flexneri*, *sonnei*: often epidemic: bad hygiene and living conditions and plagues of flies: reservoirs considered to be domestic animals and birds); brucellosis; dengue; cholera (epidemic in 1912: no cases in World War I: no recent information); kala azar and dermal leishmaniasis; leptospirosis; leprosy (rare); malaria (DDT campaign was started in 1950, in which year there were 45,484 new cases: in 1956 there were 250 recorded cases: blackwater fever disappeared in 1945); rat-bite fever; Q fever and haemorrhagic fever (thought to be a virus infection spread by ticks: high fever, bradycardia, involvement of the central and sympathetic nervous systems, bleeding from nose and into muscles and under skin, widespread peripheral petechiae, leucopenia, shift to the left, thrombopenia: reservoirs may be rodents, and certain birds, including the lark).

B. G. Maegraith

Chaudhuri, R. N. **Chronic Splenomegaly in Bengal.** *J. Indian Med. Ass.* 1957, Jan. 16, v. 28, No. 2, 101–11. [Numerous refs.]

A study of 134 patients with chronic splenomegaly is here reported in the Basanta Memorial Lecture of the University of Calcutta. All the

patients were Indians and came either from West Bengal, East Pakistan, Orissa or Bihar. There were 94 between the ages of 10 and 30 years, 96 had irregular fever while in hospital and the spleen of most could be palpated from 5–10½ inches below the tip of the ninth left costal cartilage. The liver was also enlarged in almost all cases, the maximum downward extension observed being 3½ inches below the right costal margin. There was anaemia in 93 patients, leucopenia was not uncommon but malaria parasites were found in 2 cases only and microfilariae in 3. Aldehyde and complement-fixation tests for kala azar were carried out in all, but none was positive. The Wassermann reaction was positive in 19 cases. The serum proteins were normal in most cases but the ratio of albumin to globulin was reversed in 62. In 28 patients in whom there was anaemia, bone-marrow was examined and was normoblastic in all: evidence of iron deficiency was found in 50% of the cases: no parasites or malarial pigment were found. In the stools, cysts of *Entamoeba histolytica* were found in 7 cases, ova of hookworms in 50 and of round worms in 10.

Liver was removed by biopsy in 45 cases; a normal histological picture was found in 14 of these and in the remainder the changes included those of degeneration of the hepatic parenchyma with lymphocytic, fibroblastic and occasionally histiocytic and plasma cell infiltration. Fatty change was observed in 7 cases. In nearly half there was some evidence of early portal fibrosis with infiltration of mononuclear cells and extension of young proliferating connective tissue into the lobules. In many cases the sinusoids contained clumps of round cells.

The injection of adrenalin caused an increase of up to 78% in the red blood cell count and up to 47·6% in the packed cell volume. It is considered that in those patients in whom such an increase did not occur the spleen was fibrotic. Histological examination showed the splenic architecture to be grossly disturbed, the capsule was thickened, the trabeculae prominent and fibrous tissue increased. The sinuses were congested and dilated and there was proliferation of the splenic pulp.

Spleno-portal venography was carried out in 55 patients by injecting radio-opaque material into the spleen. The commonest abnormalities found were a degree of dilatation and tortuosity of the spleno-portal veins roughly proportional to the enlargement of the spleen. In 2 cases parts of the splenic vein were narrowed—possibly as a result of previous thromboses. Barium meal examination revealed varicosities at the lower end of the oesophagus in 11 patients.

The results of treatment suggested that deficiency of iron and of specific haemopoietic factors played a part in the production of the anaemia found to be present. In 34 patients fever was controlled with antimalarials and the spleen diminished in size but in the majority of cases no diminution in splenic size occurred. Splenectomy was carried out in 22 patients who did not respond satisfactorily to other treatment; 4 died during operation and 1 three days later. Another died a year later from cirrhosis of the liver and of the 17 survivors 12 have been followed

up for 1½–2 years. In most, clinical and haematological improvement took place but the liver increased in size. A biopsy was carried out in 6 of these patients and in 2 fatty changes were found.

The conclusion is reached that the condition is not one disease entity but a symptom complex representing 3 main groups of pathological conditions. In the first of these splenomegaly secondary to intrahepatic or extrahepatic obstruction to the splenic and portal veins was considered to account for 12 cases. The second consists of those in whom malaria and malnutrition seem to have played an important role and a "causal relationship to the liver lesions can be justifiably assumed". The remaining patients appeared to be suffering from an advanced progressive stage of the condition present in the previous group. It is stated, however, that in this group of patients with enlarged spleen, hypersplenism, frequent liver changes and occasional signs of portal hypertension, the proofs of their malarial origin were not unequivocal.

[Prof. R. N. Chaudhuri is to be congratulated on having tackled so difficult and so important a subject in such a comprehensive way. He has made a significant contribution to knowledge of the disease as it affects Indian peoples.] *A. W. Woodruff*

Wainwright, J. **Siderosis in the African.** *South African J. Lab. & Clin. Med.* 1957, Mar., v. 3, No. 1, 1–28, 8 figs. [34 refs.]

Siderosis of the tissues of Africans of the Bantu race was first described in 1929, since when further investigations have confirmed its frequency in members of this race. Though the condition appears to be rare in Uganda it may be common in Ghana [see this *Bulletin*, 1954, v. 51, 1095].

This comprehensive paper reaffirms the remarkably high incidence of the condition in Bantus who comprise the hospital population of Durban. In a large series of consecutive post-mortem examinations, haemosiderin deposits were demonstrated in 80% of adult males over the age of 20 years, though abnormal pigmentation was virtually absent in the livers of subjects of both sexes below this age. In women, the pigment accumulates more slowly during the period of fertility than in men, but after the age of 50, both sexes show a comparable incidence and degree of pigmentation.

The author describes 5 degrees of hepatic pigmentation; in the earliest, fine deposits of haemosiderin are demonstrable in the periportal liver cells. With increasing intensity, the pigmentation involves the parenchymal cells throughout the lobule and appears in the Kupffer cells, while both intracellular and free aggregations form in the portal tracts.

In some of the livers of lower iron content, another pigment, haemofuscin, a lipochrome (which does not give the Prussian blue reaction), may be found. Its distribution tends to be centrilobular, and its development appears independent of that of siderosis.

The more intense degrees of hepatic siderosis are associated with cirrhosis, diabetes mellitus and skin pigmentation, the classical syndrome of haemochromatosis.

After a disappointingly brief description of the histopathological changes, the author turns to the biochemical aspects of the disease. The heaviest iron deposits occur in the liver, portal and coeliac lymph nodes, the spleen, pancreas and mucosa of the duodenum and upper jejunum; a distinguishing feature from classical haemochromatosis is the absence of pigmentation of the gastric mucosa and myocardium, and its presence to a marked degree in the spleen.

Total body iron (normally 4–5 gm.) in Bantu siderosis attains 16–20 gm., or about half that found in idiopathic haemochromatosis, when figures of 25–50 gm. occur. Plasma iron concentrations ranged from 50 to 118 μgm./100 ml. with plasma iron saturation of 27–67%. These figures, too, are lower than those attained in idiopathic haemochromatosis.

In considering aetiological possibilities, the author quotes animal experimentation, in which rats, mice, guineapigs, chickens and dogs were fed on a (protein-deficient) corn-grit diet with a high iron supplement: on this diet, but not in animals receiving a similar iron supplement to a normal diet, haemosiderin accumulated in their tissues. He points out that in the diet of the Bechuanaland Bantu, the daily iron intake is 30–40 mgm. with additional iron derived from the walls of the cooking pots: daily faecal iron excretion ranges from 65 to 145 mgm. At the same time, maize is the staple cereal and protein intake is low.

He concludes that excessive iron storage is attributable to high intake on a deficient diet, and that it is unnecessary to postulate either an acquired or an inborn error of cellular metabolism. He does not know what precise factors derange the mechanism of " mucosal block " in the proximal part of the small intestine, by which iron absorption is adjusted to requirements.

Many other facets of this fascinating and important condition remain unexplained. Its irregular distribution—in Ghana it is not apparently related to malnutrition, the cause of pancreatic fibrosis in the absence of local siderosis in some cases, and the relation, if there is one, of the lipochrome pigment to siderosis, call for further investigation.

J. H. Walters

CHARTERS, A. D. **Mushroom Poisoning in Kenya.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1957, May, v. 51, No. 3, 265–70, 1 fig. [21 refs.]

" (1) A case of poisoning by *Lepiota morgani* in Kenya has been described.

" (2) Inversion of T wave in all the praecordial leads was found in an electrocardiogram taken 6 hours after ingestion of the fungus.

" (3) Two cases of *Stropharia* poisoning in Kenya have been recorded.
" (4) Coloured vision was a symptom of *Stropharia* poisoning in one case."

Bokman, Ann H., Levine, H. B. & Lusby, Monica. **Glucose Catabolism in *Malleomyces pseudomallei*.** *J. Bacteriology.* 1957, May, v. 73, No. 5, 649–54, 1 fig. [23 refs.]

PARASITOLOGY : GENERAL

Von Brand, T. **Recent Trends in Parasite Physiology.** *Exper. Parasit.* New York. 1957, May, v. 6, No. 3, 233–44. [Numerous refs.]

Piqueras Menéndez, E. & Bravo Oliva, J. El diagnóstico parasitológico de las protozoosis intestinales. Empleo de la *E. invadens* para el control de las técnicas de coloración y métodos de cultivo. [**Parasitological Diagnosis of Intestinal Protozoal Diseases. Use of *Entamoeba invadens* for Control of Staining and Cultural Techniques**] *Med. Trop.* Madrid. 1957, Apr. 1, v. 29, No. 4, 305–35, 1 fig. [27 refs.]

Albornoz Plata, A. Ulcera gastro duodenal y parasitósis en Bogotá, D.E. [**Peptic Ulcer and Parasitism in Bogotá, Colombia**] *Rev. Facul. de Med.* Bogotá. 1956, Aug., v. 24, No. 8, 723–8. [Also in *Semana Méd.* Apr. 18, v. 110, No. 16, 517–19.]

The author examined 516 patients with peptic ulcer, 122 gastric and 394 duodenal, most of the patients being males. In 155 (30·03%) intestinal parasites were found (*E. histolytica*, 18·2%, *Ascaris*, 12·1%, *Giardia*, 6·0%, *Trichuris*, 3·0%).

The author points to the need for treating concomitant conditions in patients with peptic ulcer, and gives brief notes on the specific treatment given to some of these patients, which followed conventional lines.

He suggests that treatment for the two protozoal infections mentioned may be carried out about the time of the treatment of the ulcer, but that for the two helminthic infections it should be delayed until the ulcer has healed. *H. J. O'D Burke-Gaffney*

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Bhatia, M. L., Wattal, B. L. & Kalra, N. L. **Structure of Salivary Glands in Mosquitoes. A Preliminary Note.** *Indian J. Malariology.* 1957, Mar., v. 11, No. 1, 55–9, 2 figs.

Colless, D. H. **Notes on the Culicine Mosquitoes of Singapore. II.—The *Culex vishnui* Group (Diptera, Culicidae), with Descriptions of Two New Species.** *Ann. Trop. Med. & Parasit.* 1957, Mar., v. 51, No. 1, 87–101, 3 figs. [12 refs.]

"1. Four species of *Culex* which occur in Singapore are all identifiable in the adult stage as '*Culex vishnui*' as currently defined, although they are obviously distinct species. It is shown that none of them is conspecific with Theobald's type specimens of *C. vishnui*, which in fact differ markedly from any extant description. Of the Singapore forms, one of them is clearly that usually, but erroneously, referred to as *C. vishnui*; it is described here and named *C. pseudovishnui* sp. nov. A second form is described, and is named *C. alienus* sp. nov. The remaining two forms are identified with *C. annulus* Theobald and *C. perplexus* Leicester. The Malayan form of *C. tritaeniorhynchus* is also described in detail. It is identical with *C. tritaeniorhynchus* var. *siamensis* Barraud and Christophers, 1931, and is also shown to be identical with *C. summorosus* Dyar, 1920; it is therefore treated as a subspecies, *C. tritaeniorhynchus summorosus*.

"2. Attention is drawn to the use of the siphon-saddle ratio, as a more convenient index of relative siphonal length than the conventional siphonal index."

Bohart, R. M. **Insects of Micronesia. v. 12, No. 1. Diptera: Culicidae.** 85 pp., 14 figs. & 1 map. 1957. Honolulu: Bishop Mus. [Summary taken from *Rev. Applied Entom.* Ser. B. 1957, May, v. 45, Pt. 5, 87.]

This volume forms part of a series on the arthropods of Micronesia. The area concerned includes the islands of the Mariana, Caroline, Marshall, Gilbert, Bonin and Volcano groups, and also Ocean, Nauru, Wake and Marcus Islands. All but three of the mosquitoes recorded belong to the genera *Aëdes* and *Culex*. Of the 42 named species of these genera (one of which is represented by two subspecies), 28 are seen from a distributional list to be confined to the area and most of these to particular island groups. Keys are given to the adults of all the species and to the male genitalia, larvae and pupae where possible. Each

species is then described, 13 of them as new, from both sexes, larva and pupa wherever possible, and synonyms are given, together with notes on distribution, habits, ecology and importance as a pest or disease vector, if any. The principal mosquito-borne diseases have been dengue, primarily as a wartime scourge, and Japanese B encephalitis, an outbreak of which occurred on Guam in 1947. A rather benign type of filariasis [caused by *Wuchereria bancrofti*] is believed to be transmitted by *Culex pipiens fatigans* Wied. (*C. quinquefasciatus*, auct.) and, on Truk, by *C. annulirostris* Skuse.

Marks, Elizabeth N. **Some Mosquitoes from Western Samoa, with a Description of a New Species of** *Aëdes* (*Stegomyia*) **(Diptera, Culicidae).** *Ann. Trop. Med. & Parasit.* 1957, Mar., v. 51, No. 1, 50–57, 2 figs. [13 refs.]

"A collection of eight species of mosquitoes from Upolu Island, Western Samoa, includes six which have previously been recorded, *Aëdes samoanus*, *A. aegypti*, *A. polynesiensis*, *Culex fatigans*, *C. annulirostris* and *C. sitiens*, and a species of *Taeniorhynchus*, which provides a new generic record for Samoa; notes are given on all these specimens.

"Also included in the collection is *Aëdes* (*Stegomyia*) *upolensis* sp. nov. The male, female, larva and pupa are described, and the relationship of the new species with other members of the *scutellaris* subgroup is discussed."

Barr, A. R. **The Distribution of** *Culex p. pipiens* **and** *C. p. quinquefasciatus* **in North America.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 153–65, 9 figs. [10 refs.]

By comparison of measurements of the dorsal and ventral mesosomal arms of the genitalia of 3,500 males of *Culex p. pipiens* and *C. p. quinquefasciatus* (= *C. fatigans*) it was possible to show that *C. p. pipiens* is usually found in America north of 39°N., and that *C. p. quinquefasciatus* is usually found south of 36°N. Males captured between these latitudes may belong to either form or may be intermediate. As there appears to be little doubt that the two forms hybridize in nature the author suggests that the subspecific names should be retained [see also this *Bulletin*, 1952, v. 49, 651]. *B. R. Laurence*

Khan, M. A. **The Effect of Dietetic and Glycemic Factors in the Attractiveness of White Rats to Mosquitoes.** *Canadian J. Zool.* 1957, Apr., v. 35, No. 2, 189–93.

"White rats on high carbohydrate, high protein, and high fat diets showed increased attractiveness to mosquitoes, *Aedes aegypti* L., in the order mentioned. This preference for rats on certain diets was shown by mosquitoes only on simultaneous exposures of all diet groups and was

not noticed when various diet groups were individually exposed or the mosquitoes had been starved previously. The increased or decreased blood sugar levels did not affect the attractiveness of the rats to the mosquitoes. It appeared that certain residual factors were emitted by rats which attracted mosquitoes to an appreciable extent for ½ hour."

Sautet, J., Aldighieri, R. & Vuillet, J. Accoutumance exérimentale à un insecticide à base de D.D.T. d'une souche d' "Aedes aegypti" en provenance de Haïti et comparaison avec des souches d'autres provenances. [**Experimental Resistance to DDT of a Strain of *Aëdes aegypti* from Haiti compared with Strains from Other Sources**] *Méd. Trop.* Marseilles. 1957, Mar.–Apr., v. 17, No. 2, 246–50, 1 fig.

The authors have made a few comparative tests with strains of *Aëdes aegypti* from various sources—(A) a susceptible laboratory colony, reared for many years in Paris; (B) a DDT-resistant strain from Haiti, collected near Port-au-Prince in 1955; (C) a DDT-resistant strain from Trinidad; (D) a DDT-resistant strain from Malaya. (Strains C and D were obtained from colonies in London, maintained by the abstracter.) All these strains were maintained without DDT selection; but a sub-colony of the Haiti strain was selected for DDT-resistance for 4 generations.

A rather crude test method (addition of varying numbers of drops of a suspension of DDT wettable powder to a bowl of larvae) showed that the order of DDT resistance of the strains was as follows:—Haiti selected strain>Trinidad strain>Malaya strain>susceptible colony.

J. R. Busvine

Kilpatrick, J. W. & Schoof, H. F. **Fly Production Studies in Urban, Suburban, and Rural Privies in Southeastern Georgia.** *Amer. J. Trop. Med. & Hyg.* 1957, Jan., v. 6, No. 1, 171–9, 4 figs.

In view of the reported increase in house-fly breeding in privies treated with insecticide [this *Bulletin*, 1955, v. 52, 221; 1956, v. 53, 1284] the authors determined the normal fly population of untreated privies in Georgia as a preliminary to experiments to determine the effect of treatment with insecticides [for these experiments see *ibid.*, 1957, v. 54, 98]. Flies were trapped as they emerged from 100 privies in urban, suburban and rural areas. The 175,370 flies captured belonged to 97 species and 33 families. The fauna changed markedly during the year but no significant differences were found between the fly populations of urban, suburban and rural areas. The house-fly was not a predominant species in any month, and most of the species breeding in the privies would relatively rarely as adults come into contact with man. Only *Musca domestica, Fannia, Ophyra, Drosophila, Culex quinquefasciatus* (= *fatigans*) and species of Calliphoridae (especially *Phaenicia* (= *Lucilia*)

sericata) would be important in this respect. Approximately 24% of the total flies collected were *Culex quinquefasciatus*. *B. R. Laurence*

Moreland, C. R. & McLeod, W. S. **Studies on Rearing the House Fly on a Bran-Alfalfa Medium.** *J. Econom. Entom.* 1957, Apr., v. 50, No. 2, 146–50. [18 refs.]

Ascher, K. R. S. **Prevention of Oviposition in the Housefly through Tarsal Contact Agents.** *Science.* 1957, May 10, v. 125, 938–9. [10 refs.]

Graphical formulae are given of 2 organic compounds, only recently available, which, when applied topically in acetone or by tarsal contact to female *Musca domestica*, inhibit oviposition. Insemination and ovarian development are normal but there is retention of the eggs. Oviposition was normal if the substances were fed to the flies in milk or administered as a vapour. Both compounds are slightly toxic to normal flies, and Swiss strain (K) with polyvalent resistance to insecticides has been a valuable material in these studies. The compounds are: di-(*p*-chlorophenyl)-trifluoromethylcarbinol, and di-(*p*-chlorophenyl)-pentafluoroethylcarbinol.

Reports are noted, from the literature, of dieldrin (in sublethal doses) increasing the reproductive potential in house-fly and fruit flies and a similar effect of DDT on spider mite. In fruit flies (*Drosophila*) DDT slightly reduces oviposition. *D. S. Bertram*

Bridges, Patricia M. **Absorption and Metabolism of [^{14}C] Allethrin by the Adult Housefly,** *Musca domestica* **L.** *Biochem. J.* 1957, June, v. 66, No. 2, 316–20, 1 fig. [18 refs.]

Gersdorff, W. A., Mitlin, N. & Piquett, P. G. **The Relative Toxicity, Synergistic Activity, and Knockdown Effectiveness of Mixtures of Piperonyl Butoxide with Allethrin and its *Trans* Fraction and Isomers as House Fly Sprays.** *J. Econom. Entom.* 1957, Apr., v. 50, No. 2, 150–56.

"A comparative study was made of the toxicity, synergistic activity, and knockdown effectiveness of mixtures of piperonyl butoxide with allethrin and its *trans* fraction and isomers when applied to 10:1 proportion as space sprays on the Campbell turntable against house flies, *Musca domestica* L.

"The mixtures with the *l*-allethrolone *d-trans* chrysanthemumic acid ester, the *d-l* ester, the *l-l* ester, the *d-d* ester, the *dl-trans* fraction, and allethrin were, respectively, 1·93, 0·41, 0·029, 10·34, 3·86, and 3·03 as

toxic on the basis of equivalents as allethrin alone. The first five in the same order were 0·64, 0·14, 0·01, 3·41, and 1·27 as toxic as the allethrin mixture; except for the *l-l* ester, these are the same relationships as were found previously for the unsynergized toxicants.

"Synergism with respect to mortality was demonstrated in all mixtures. The intensity of synergism was threefold at the 50% mortality level in each isomer mixture, in the *dl-trans* fraction mixture, and in the allethrin mixture. This intensity was indicated by deduction for the *l-l* isomer but could not be demonstrated experimentally, probably because of the relatively low toxicity of the isomer. Because of differences in slopes of regression lines, the intensity varied from two to nearly five between the 5 and 95% levels. In all mixtures there was no synergistic action with respect to knockdown in 25 minutes.

"Relative knockdown effectiveness for the mixtures was approximately the same as their relative toxicity. The conclusion is made that initial paralysis and lethal action are not separate, distinct types of toxic action, but are phases of a single physiological reaction.

"In the mixtures the intensity of the stimulus required to cause a given mortality was about three times that required to cause the same percentage knockdown in 25 minutes."

Gersdorff, W. A. & Piquett, P. G. **Comparative Effects of Piperettine in Pyrethrum and Allethrin Mixtures as House Fly Sprays.** *J. Econom. Entom.* 1957, Apr., v. 50, No. 2, 164–6.

"The results clearly establish piperettine as a synergist for fly sprays. The intensity of synergism with pyrethrins was very high, the toxicity of the mixture being 14 times that expected. This intensity places the compound, as appraised by the turntable method, among the best commercial synergists with pyrethrins, such as sulfoxide [this *Bulletin*, 1953, v. 50, 574], sulfone [*ibid.*, 1955, v. 52, 842], and piperonyl butoxide [*ibid.*, 1952, v. 49, 563]. With allethrin, however, the intensity of synergism was very low. Piperettine was no more, and probably less, effective in synergizing allethrin than the three commercial synergists named above.

"Knockdown of flies was complete in all sprays containing the insecticides. Piperettine alone at 200 mg. per deciliter caused no knockdown or mortality."

Schulz, K. H., Crutkhow, C. & Sitachitta, C. **A Demonstration Project of Fly Control using "Chlordane" in a Monsoon Area, Thailand.** *J. Trop. Med. & Hyg.* 1957, June, v. 60, No. 6, 141–5.

Fly control by residual spray with chlordane and general measures of hygiene in restaurants, teashops, markets, slaughter-houses, and dwellings

was instituted in Chiengmai town, Thailand, in July and August before the monsoon. The insecticide was sprayed on selected indoor surfaces observed to be frequented by flies (*Musca*). This included floors and furniture. Resting places on outside walls and on the ground or stalls of markets and outside walls of slaughter-houses were also sprayed. Burial pits for slaughter-house wastes and other accumulations from slaughter-houses were heavily sprayed but the deposit on walls, etc., was estimated at 1·86 gm. chlordane per square metre. These efforts were supported by public propaganda and participation by interested bodies.

Good fly control lasted for 8 to 10 weeks. The monsoon rains washed away much of the insecticide outdoors and also created fresh breeding facilities for flies. A second control programme in December after the rain was less efficient because there were insufficient funds to carry out the work thoroughly.

The paper gives details for preparing the formulation of insecticide used, some indication of costs, and describes tests of the insecticide against small numbers of *Musca* and *Calliphora*. The latter was less susceptible than *Musca*. *D. S. Bertram*

Lawton, A. H., Dexter, M. W. & Warren, L. O. **Double Infestation of a Varicose Ulcer with Screw-Worm and House Fly Maggots.** *Amer. J. Trop. Med. & Hyg.* 1957, Mar., v. 6, No. 2, 336–8.

"The individual whose case is summarized presented himself with a necrotic varicose ulcer of the lateral aspect of the right leg in which maggots of *Callitroga americana* and of *Musca domestica* were living in symbosis. The *Callitroga* maggots had penetrated deeply into healthy muscle and fibrous tissue and were feeding avidly on normal tissue. The muscoid maggots were present superficially feeding in the necrotic material much of which was being provided by the activity of the *Callitroga* maggots."

See also p. 1114, Crosskey, **Man-Biting Behaviour in *Simulium bovis* De Meillon in Northern Nigeria, and Infection with Developing Filariae.**

Abonnenc, E., Larivière, M. & Yvinec, M. L. Observations sur la biologie de quelques Phlébotomes de la région éthiopienne en milieu expérimental. [**Observations on the Biology of *Phlebotomus* of the Ethiopian Region under Experimental Conditions**] *Ann. Parasit. Humaine et Comparée.* 1957, Jan.–Mar., v. 32, Nos. 1/2, 173–84, 1 graph & 2 figs.

Notes are given on the feeding, oviposition and duration of development of 3 species and 2 subspecies of *Phlebotomus* that the authors have

succeeded in rearing at Dakar. Females have been fed in tubes on gecko blood. After feeding single females were kept for 3–9 days in Borrel tubes, containing damp cotton wool covered by filter paper and an additional slip of filter paper. Eggs were laid singly or in groups, mostly on the filter paper. Females laid from 6–83 eggs at one oviposition and 1 female of *P. freetownensis magnus* laid 162 eggs in 2 ovipositions.

At 28–30°C the eggs hatched after 4–8 days, and the larvae were kept in Borrel tubes containing finely pulverized decaying organic material [both of animal and vegetable origin but not specified]. Water was added daily to maintain the humidity in the tubes. The larval stage of the species studied lasted for 11–18 days at 28–30°C. and adults emerged 17–31 days after the eggs had hatched. At 20–23°C. the eggs of *P. freetownensis sudanicus* hatched after 9–13 days and adults emerged 55–63 days later. *B. R. Laurence*

Koumans, A. K. J. Acariasis Pulmonum. [**Acariasis Pulmonum**] *Nederl. Tijdschr. v. Geneesk.* 1957, June 15, v. 101, No. 24, 1122–4, 3 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"Report on a case of pulmonary acariasis (infection of the respiratory tracts with mites) in the Netherlands, with the typical symptoms: fever, spastic bronchitis, transient infiltration of the lungs, eosinophilia. The pathogenic agent (Tyroglyphida) was repeatedly demonstrated in the slightly bloody sputum."

O'Brien, R. D. **Properties and Metabolism in the Cockroach and Mouse of Malathion and Malaoxon.** *J. Econom. Entom.* 1957, Apr., v. 50, No. 2, 159–64, 3 figs. [19 refs.]

Jarvis, F. E., Jr., Grayson, J. M. & Levitan, M. **Further Evidence for Autosomal, Multiple-Factor Inheritance of Chlordane Resistance in the German Cockroach.** *J. Econom. Entom.* 1957, Apr., v. 50, No. 2, 185–7, 2 figs.

Milani, R. Ricerche genetiche sulla resistenza degli insetti alla azione delle sostanze tossiche. [**Genetic Studies on Resistance of Insects to Toxic Substances**] *Riv. di Parassit.* Rome. 1956, Oct., v. 17, No. 4, 223–46 & 1957, Jan., v. 18, No. 1, 43–60. [150 refs.]

This is a full review of the genetics of resistance under the following headings: assessment of the character; multifactorial, monofactorial and

cytoplasmic inheritance; specificity of resistance; application and relaxation of selection pressure; morphological, bionomic and biochemical differences between resistant and susceptible strains; mutability.

MISCELLANEOUS PAPERS

Edington, G. M. & Tettey, C. **Survey of Medical Publications from the Gold Coast, 1953–54.** *West African Med. J.* 1957, Mar., v. 6 (n.s.), No. 1, 22–5. [37 refs.]

Gold Coast. **Medical Bibliography of the Gold Coast 1900–1951 with an index** [Hughes, M. H., compiled by]. 27 + 3 mimeographed pp. 1953. Accra: Govt. Printing Dept.

Sergent, Ed. De l'intérêt de la recherche de l'indice digital chez les populations africaines. [**Research on the Index Finger of African Populations**] *Arch. Inst. Pasteur d'Algérie.* 1957, Mar., v. 35, No. 1, 35–9, 4 figs.

The relative lengths of the index finger and the ring finger may be represented thus:—

A when the ring finger is the longer
I when the index finger is the longer
= when they are equal.

It is found that these relative lengths may be used as an index of body-type for although differences are frequently more pronounced in the left hand, the two hands always fall into the same category which does not change with age and shows little difference between the sexes. When measuring, care must be taken with the position of the hand.

It is found that the percentage of indigenous people falling into category A varies in different races. The following figures have been recorded in different countries: Madagascar 77·3%, French Oriental and Equatorial Africa 73%, Algeria 62·6%, yellow races (Annamites and Moïs) 41%, white races 45%. These figures were obtained by Etienne Sergent. Since his death in 1944 the following additional figures have become available: Togo and Dahomey 30 out of 47 (64%) and French Guinea 63·8%. It is suggested that surveys of this character may throw light on the origins of races.

Similar observations have been made among apes. The author suggests observations could profitably be made on identical twins which he expects to show the same indices. *Frederick J. Wright*

KENNEY, R. A. **Some Observations on the Renal Function of the Male West African.** *J. Trop. Med. & Hyg.* 1957, Apr., v. 60, No. 4, 79–90, 5 figs. [58 refs.]

Renal function was studied in young male West Africans of various tribes in Nigeria. Glomerular filtration rate (GFR) and renal plasma flow (RPF), by clearance of creatinine and sodium para-amino-hippurate respectively, were within the normal range for Europeans. High ambient temperatures significantly depressed GFR and RPF and raised the filtration fraction GFR × 100/RPF). Exercise reduced GFR and RPF at all temperatures.

These results and the complicated changes in renal resistance on exercise indicate that West Africans resemble Europeans closely in renal haemodynamics and also in the way they react to additional heat stress.

The phenomenon of "dehydration by drinking" was found in West Africans but the critical temperature above which ingested water was retained was 75°F. as compared with 65°F. for Europeans. Thus water may be conserved by not drinking till the day becomes warm. Economy of drinking-water is also achieved by drinking small volumes (100 cc.) frequently.

The European kidney showed a higher concentrating power than the African when tested by 3 methods including the urea concentration test.

It was confirmed that plasma urea concentrations were significantly lower in Africans than in Europeans: creatinine clearance was the same in both groups but Africans had a lower urea clearance and failed to show the "augmentation" phenomenon at different urine flow rates which is so characteristic of urea excretion in Europeans.

The author concludes that the difference between reactions in the two races is to the detriment of the Africans. *M. L. Thomson*

WHITTOW, G. C. **Renal Excretion of Water and Salt by Healthy People in Singapore.** *Med. J. Malaya.* 1956, Dec., v. 11, No. 2, 126–33, 1 fig. [21 refs.]

This study was undertaken because of the projected fluorination of the Singapore Municipal Water Supply, as well as for its intrinsic interest.

66 students and laboratory staff took part; they were Chinese, Indians, Malays or Europeans. The subjects, aged mainly 18–27 years, collected their urine and measured their fluid intake for 8 or 24 hours; in 10 cases for both periods.

In this warm, humid climate (mean temperature 79·8°F.; mean humidity 85%) urine volume was approximately equal to, and the urinary chloride excretion greater than, standards generally considered adequate in the tropics.

In the Malay subjects mean fluid intake and urine output were low, and urinary chloride high, as had been previously found by other workers.

Nevertheless hospital records did not yield evidence that calculus of the urinary tract was commoner in this race than in Chinese or Indians.

M. L. Thomson

REPORTS AND SURVEYS

CHARTERS, A. D. **Changes in Morbidity in the Teso District of Uganda during the Last Quarter Century.** *East African Med. J.* 1957, Mar., v. 34, No. 3, 87–91.

The author has recently revisited the CMS Hospital at Ngora, Uganda, after a lapse of 25 years. He reflects on the changed pattern of disease resulting from social and economic advances during the intervening period. These have resulted largely from the development of the prosperous cotton-growing industry.

Tropical ulcer has declined dramatically from 29% of all admissions in 1933 to 0·16% in 1955. This reflects better nutrition and more adequate protection to the feet and legs. The development of a clean water supply from bore-holes and protected wells has practically eliminated dracontiasis. With improved sanitation, housing and more clothes, yaws is rapidly disappearing. Pyomyositis is now very rare. For less obvious reasons *Wuchereria bancrofti* filariasis, a common cause of hydrocele, has also notably declined; more adequate clothing and lighter, better-protected houses probably account for this, together with general anti-mosquito measures, including the drainage of swamps and bush clearing. Blackwater fever, which was prevalent among Europeans and Asians 25 years ago, has not been seen during recent years, as a result of replacement of quinine by choroquine for malarial prophylaxis and treatment.

Increasing contact with the outer world resulting from these advances, as in other parts of tropical Africa, has exacted its price in the introduction of tuberculosis, though the author considers that soldiers returning to the Teso district from World War II may have carried it in.

[The author's experience would find support in an examination of the records of any hospital situated in a rural area of tropical Africa which has undergone recent development, for, once malarial premunity has been acquired in childhood, tuberculosis becomes the outstanding problem in endemic disease.] *J. H. Walters*

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